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PACKAGE FREIGHT OWNER-SHIPS.

Buffalo, Feb. 18.—There has been a great amount of guess work information as to the changes made here in the ownership and management of the package freight lines, all consequent on the moves made by President Heald of the Mutual company. While these are really radical and have put at an end one well-known line they are not so large as they have been supposed, as they leave the Lehigh valley line intact and do not by any means extinguish the Union Steamboat Co., of the Erie Railroad Co.

The Mutual company, which has for several years owned the six freighters built by James J. Hill for the Northern Steamship Co., has this winter bought the four steamers, St. Paul, Minneapolis, W. C. Rhodes and Huron of the Soo line and will include them in the line, though they will mostly be run between Buffalo and Gladstone, much as they have always been, covering Green Bay indirectly. This is the shortest connection between St. Paul and New York and seems to be very satisfactory, as freight shipped by this route westward is sometimes in St. Paul or Minneapolis before a steamer leaving Buffalo at the same time is fairly in Chicago.

The six steamers of the Union Steamboat Co., Starrucca, Ramapo, Chemung, Oswego, Tioga and Binghamton, are not absorbed into the Mutual line, but President Heald has merely been given the management of them in a separate way and they will continue in their trade with Chicago as before. The line is the individual property of the Erie company and has no separate existence, corporate or otherwise.

President Heald says that there is no foundation of the reports that he was to control the Lehigh valley line. He

has nothing to do with them and they will continue as before.

This reduces the lines carrying package freight between Buffalo and the upper lakes to five and makes a decided difference in the general outlook. There used to be a time when every railroad reaching the lakes felt that it needed a line on the lakes and there were also combined lines and individual lines. The combined lines usually suffered from disagreements among the various owners, which were mostly some of the older and larger lines, as the Lake Superior Transit line, made up of vessels from the Union, Western and Anchor lines to cover the Lake Superior trade, which it did for a considerable time.

Then there began to appear the Northern, Lehigh valley, once under a single management in the palmy days of John Gordon, and the Crescent and Union Transit lines, which came up as the Ward's Detroit & Lake Superior line went down. There were the shorter-lived Green Bay line, the Lackawanna and Wisconsin Central lines and there were the Wabash and Clover Leaf line out of Toledo, all doing business with Buffalo, not to mention the Ogdensburg line, covering the upper lakes from that port, which as the Vermont Central line was sometime ago absorbed by the New York Central's Western Transit line, though still managed as a separate interest.

A dozen years ago nearly all these lines were running at the same time, but they began to take a decided decline when the older of the still existing lines began to make it hard for the weaker ones to get eastern rail connections, and without which they were entirely helpless. They could do business westward, for they could use the Erie canal if the eastern roads would not affiliate with them, but as a distributor of eastern freight the canal was not what was needed.

There was also the general tendency to concentrate such interests, which may go on somewhat further, but looks likely to remain where it is for awhile. When the new Erie Barge canal is finished there will be a further adjustment because of the chance it will afford for new lines to be run in connection with the lake lines. If the canal is a success it will be too large an interest to be given over to individual boatmen as the old canal has always been. There does not appear to be much change in prospect in the three undisturbed lake lines, though they will still try to grow steadily. The Western line is building a new steamer, to be out after midsummer and it will add two new steamers to the Vermont Central line. It is understood that the Anchor line has chartered the Lackawanna and Scranton for the season.

For while the number of lines decreases the capacity steadily increases, as there is more business every year. It is believed that there will be quite a good increase of it the coming season over last season.

JOHN W. CHAMBERLIN.

In the last report of the chief of the bureau of construction and repair attention is called to the fact that ships constructed by government force cannot possibly cost as little as those those bought from private builders. Hours of labor are shorter, pay higher and holidays more frequent in government employ than elsewhere. The plea made for such construction in one yard on the Atlantic coast and one on the Pacific coast is based on an entirely different consideration—the maintenance, which such construction permits, of an efficient body of trained mechanics able to carry out emergency repairs and forming a reliable nucleus for large gangs in case of military necessity.

ITEMS OF GENERAL INTEREST.

The Rutland line steamers, Haskell and Averell, are receiving new boilers at Ogdensburg.

The new dry dock of the Merrill-Stevens Co., Jacksonville, Fla., is ready to go into commission.

Steamers suitable for excursion service at the Jamestown exposition are very much in demand.

The Old Dominion Steamship Co.'s steamer Princess Anne will be lengthened by 46 ft. at Cramp's.

The steamer Denver is being converted into a suction dredge for the Daly & Hannan Dredge Co., at Ogdensburg.

Kelly Bros., of St. Johns, Ore., will erect a ship building dry dock plant to cost \$1,000,000, at Portland, Ore.

The Old Dominion liner Princess Anne is at the Cramp yards, Philadelphia, for the purpose of being lengthened 46 ft.

The Lloyd-Brazileiro have acquired by time charters eight or nine British steamers for their New York to Rio service.

There are now in commission in the navies of the world 104 submarines, while there are 100 under construction or authorized.

The American liner St. Paul is to receive new boilers and a general overhauling at the Newport News yard at a cost of \$250,000.

A new chart of Racine Harbor, Wisconsin, has just been issued by the United States Lake Survey and is for sale by THE MARINE REVIEW.

The steamer Princess Anne, of the Old Dominion line, is to be lengthened 46 ft., William Cramp & Sons having obtained the contract.

The eleventh International Navigation Congress will be held in St. Petersburg in May, 1908, according to an official Russian announcement.

A new chart of Menominee Harbor, Green Bay, Lake Michigan, has just been issued by the United States Lake Survey and is for sale by THE MARINE REVIEW.

The Standard Oil Co. has ordered a tug from the Skinner Ship Building & Dry Dock Co. to be 100 ft. long, 23 ft. beam and 12 ft. molded depth.

The steamer Juniata of the Merchants & Miners' Transportation Co., Philadelphia, is to be lengthened 40 ft., and bids for the improvement have been invited.

A service between New York and Brazil is to be established by the Hamburg-American Steam Packet Co. and the Hamburg-South American Steamship Co.

It is reported that Japan is to build a 22,000-ton battleship, the order going to the construction bureau at Yokosuka, where the Satsuma was built.

A contract for the delivery of 20,000,000 barrels of liquid fuel over a period of ten years is reported to have been given to California refineries by the Toyo Kisen Kaisha.

Mr. L. C. Waldo, of Detroit, manager of the Northwestern and Roby Transportation Companies, and Mr. W. A. Prime of New York, left for England recently.

The steamer Monteagle is receiving new decks and hatches and new outside planking, steam steerer and other necessary repairs. The work is being done at Ogdensburg.

A. E. Barker, formerly chief engineer of the United States Transportation Co.'s steamer, W. H. Gratwick, has been appointed chief engineer of the Geo. Hall Coal Co.'s steamers.

Bids have been asked for by the Baltimore & Carolina Steamship Co. for a steel steamer to be 235 ft. long and 35 ft. beam. The Maryland Steel Co. is one of the bidders.

The Japanese liner Awa Maru which stranded at Redcar recently has been floated by Furness, Withy & Co. Ltd., Hartlepool, and taken to the Tyne for docking and repairing.

The Marine Steamship Co., running a line from New York to Portland has recently been taken over by Stevenson Taylor and his associates in the Quintard Iron Works.

The steamship Kalibia has undertaken to carry a general cargo from the Tyne to San Francisco, being the first steamer ever chartered from the Tyne for such a voyage.

The American, Red Star and Atlantic Transport lines are to be equipped with the apparatus of the Submarine Signal Co., contracts having just recently been closed.

The name of the Robert Dollar, a well-known Pacific coast steamer recently sold to the Slade Shipping Co., has been changed to the Fair Oaks by authority of the commissioner of navigation.

The New York, Philadelphia and Norfolk Railroad Co. has awarded contract to the Maryland Steel Co. to build a passenger steamer 260 ft. long, 40 ft. beam and 15 ft. 3½ in. deep.

On Jan. 16 the furnaces of the Moran Co.'s steel plant at Seattle were closed, owing to lack of fuel. The shortage is interfering to a considerable extent with ship building at Puget Sound yards.

It is announced that the Canadian Pacific railroad will order two new Empress liners for delivery in eighteen months. They are to make the trip from Yokohama to Victoria under ten days.

The Ann Arbor Railroad will rebuild its car ferry No. 1, probably at Manitowoc. The work will be similar to that on her sister ship, Ann Arbor No. 2, which was extensively repaired last year.

The Clyde line steel freighter Pawnee was launched Jan. 28 at Harlan & Hollingsworth's yard, Wilmington, Del. The Pawnee is 267 ft. long and is for service between Philadelphia and New York.

Robert W. Hunt & Co. have been appointed consulting engineers to the receivers of the Union Traction Co., Chicago, and placed in direct charge of the lowering of the car tunnels under the Chicago river.

The Dubuque Boat & Boiler Works, Dubuque, Ia., will shortly deliver the ferry Albatross to the Queen & Crescent Railway, Vicksburg, Miss. The Albatross is 305 ft. long, 52½ ft. beam and 7 ft. 9 in. deep.

The Erie railroad has remodeled its ferry boat Susquehanna, devoting her exclusively to passenger carrying service. She is now the only ferry boat in the east which does not carry both passengers and teams.

The Italian Navigation Co., La Veloce, is desirous of acquiring two or three steamers of about 10,000 tons gross, with a speed of 16½ knots, for use in its emigrant service from Italian ports to the United States.

The New York State branch of the National Rivers and Harbors Congress held a meeting at the Produce Exchange, New York city, recently. Commercial organizations throughout the state were represented.

The London & Southwestern Railway Co. proposes to construct a deep-water dock at Southampton, to have a 300 ft. entrance and be 40 ft. deep, capable of accommodating four of the largest vessels afloat at any stage of the tide.

The steamer Sun, built for the Sun Oil Co., for their Pacific coast oil trade, was launched Jan. 21, at the yards of the Newport News Ship Building & Dry Dock Co. The Sun is 406 ft. long, 49 ft. 9 in. beam and 30 ft. 3 in. depth.

The Quintard Iron Works Co., Trenton, N. J., will install eight new boilers aboard the Long Island Sound steamer Connecticut, which is being thoroughly overhauled. The boilers are each 13 ft. diameter by 11 ft. 7 in. long.

The Moltke of the Hamburg-American line went aground in lower New York bay recently as she was bound out for the Mediterranean. The liner worked herself back into deep water at high tide and proceeded on her voyage.

At the annual meeting of the directors of the Pacific Coast Steamship Co., Mr. J. C. Ford was elected president, Mr. W. E. Pearce was re-elected vice president and manager, and C. E. Hyde was re-elected secretary.

The turbine passenger steamer *Immingham*, built by Swan, Hunter & Wigginham Richardson, Ltd., Wallsend-on-Tyne, for the Great Central Railway Co., was recently given her six hours' official sea trial, which was highly satisfactory to her owners.

The four steamers of the United Steamship Co., of Copenhagen, engaged in the service to America, are to be fitted with wireless telegraph apparatus, contract having been made with the Amalgamated Radio-Telegraph Co., of London, for the installation.

The United States circuit court of appeals recently rendered a decision which gives to the Western Pacific terminal facilities at Oakland waterfront, thus defeating the Southern Pacific which had previously gained a victory in the circuit court.

The new steamer which the Dominion line has ordered of Harland & Wolff, Belfast, will be named the *Alberta*. The vessel, which is for Canadian service, will be of 14,000 tons gross and 9,000 tons net register and will have a speed of 16 knots.

The steel passenger and freight steamer building for the Savannah line by John B. Roach, Chester, Pa., will be of 5,600 gross tonnage, 400 ft. long, 49 ft. beam and 27 ft. depth. She will have triple expansion engine 28, 46 and 75 by 48 in. and four boilers 147 by 10.5 ft.

Tacoma and Seattle are turning to the Orient to relieve the coal famine, the steamships *Lyra*, *Quito* and *Pleiades* having brought 7,000 tons from Japan recently. This is the first instance of coal importation from the Orient to the Pacific coast for local use.

The new Japanese-Philippine Shipping Co. will ask tenders from British ship builders for the construction of seven large steamships. The tenders of American ship builders were regarded as much too high. The money for the new steamers has been subscribed in Tokio.

The Atlantic & Birmingham Construction Co. has awarded contract to the Fore River Ship Building Co. for a fifth steel freighter, to run between New York and Brunswick, Ga. The same builders have two vessels completed and two nearing completion for the same line.

The Hughes Manufacturing Co., of Los Angeles, Cal., importing hard woods for the manufacture of banking fixtures, etc., will add to its equipment one or two steamers at a cost of from \$90,000 to \$125,000 each, one to be built on the Pacific coast and the other to be purchased in the east.

The new steel passenger steamship *Havana* of the Ward line sailed on

her maiden voyage to Havana recently. The vessel is 413 ft. long, 50 ft. beam and of 9,000 tons displacement. She has triple-expansion engines, twin screws and is capable of attaining a speed of 18.35 knots.

The builders of a railway across Nova Scotia, Messrs. Mackenzie & Mann, plan to establish passenger steamer service between Victoria Beach and St. John and also between Victoria Beach and Boston and are in the market for cargo and passenger steamers for this service.

The Brazilian government recently ordered in England three battleships somewhat similar to the *Dreadnought*. Two of the hulls are to be built by Sir W. G. Armstrong, Whitworth & Co. and the remaining hull and the engines for the three ships will be built by Messrs. Vickers, Sons & Maxim.

At the annual meeting of the stockholders of the Cleveland & Buffalo Transit Co. held this week all the old directors were re-elected. Mr. T. F. Newman, general manager, announced that plans for the new passenger steamer will be ready to be submitted to the ship builders next month.

At the beginning of this year the government of Canada was formerly given possession of the British dock yard at Halifax, N. S., the British admiralty reserving the right to use the yard and buildings for repairs or docking of warships, and to use the naval hospital for sick British sailors.

There was launched recently at Cramp's, Philadelphia, the steamer Massachusetts of the New England Navigation Co.'s fleet, designed for the company's new outside route from New York to Boston. She is 395 ft. long, 52 ft. beam and 23 ft. deep. Two more vessels are building for the same line.

When the work now in progress on the Suez canal is completed, the depth throughout will be 31 ft. and the bottom width 128 ft. This will enable vessels to pass through the canal at a maximum speed of nine miles per hour, instead of six miles as at present, thus reducing the time of passage from 18 to 12 hours.

Admiral Montecuccoli, of the Austro-Hungarian navy, supports the present policy of enlargement on the grounds that owing to the depth of their canals it is necessary they should build large ships of war as defenses from great hostile ships which might attempt to pass through the waterways.

It is reported that the Canadian Pacific railway's executive has under consideration steamers *Empress of Britain* and *Empress of Ireland* to the

Pacific, in which event two new liners for the Atlantic service will be built which will be larger and faster than the *Empress of Britain* and *Empress of Ireland*.

It is reported that the finest of the channel and first cruiser squadron fleets of the British navy, in command of Rear Admiral George Neville, O. V. O., will be sent to the international demonstration which will occur on the opening of the Jamestown exhibition. The ships will visit Halifax and Quebec before recrossing the Atlantic.

The submarine torpedo boats *Porpoise*, *Shark* and *Plunger* will be sent by the navy department to Annapolis, so that the midshipmen may become familiar with their operation. The submarine *Holland* was formerly stationed at Annapolis. These vessels are all of the type constructed by the Electric Boat Co.

The tug *Tartar* of Swansea, England, is now on a voyage of 16,300 miles through the Straits of Magellan to Vancouver, B. C., having been acquired by Mr. T. Milward for lumber towing purposes. The tug was built by Messrs. Scott & Sons, Bowlin, and engined by Mr. James Ritchie, Glenavon Works, Partick.

London interests are reported to be financing a scheme to erect a large floating dry dock at Vancouver, B. C., and ultimately to have a complete ship building plant. It is planned to consolidate the B. C. Marine railway of Victoria and Vancouver, the Vancouver Engineering Works and the new Westminster foundry.

The reorganization of the Russian navy was begun recently by the appointment of Admiral Dickoff, minister of marine, he thus becoming virtually commander-in-chief, a complete change from the policy pursued when Grand Duke Alexis was at the head of the navy. The acting minister was then only a civil functionary.

The new passenger and freight steamer *City of Stamford*, building for the North & East River Navigation Co., was launched Jan. 15 at Kennebunk, Me. The vessel will ply between New York and Stamford, Conn. She is 145 ft. over all, 35 ft. beam and 9 ft. depth of hold, with engine 15 and 32 by 22 in. and a Scotch boiler 11 by 11 ft.

Mr. George P. Wilson, national president of the Marine Engineers' Beneficial Association, and for the past nine years general manager of the Asbestos & Magnesia Mfg. Co., Philadelphia, Pa., has left that company and is now with the Philip Carey Mfg. Co., with offices at the southwest corner of 12th and Butwood streets, Philadelphia.

The Ketchikan Steamship Co. has

awarded a contract to the Moran Co., Seattle, for a steel steamer 150 ft. long and 35 ft. beam. She will have triple-expansion engines and is to attain a speed of 10 knots. The vessel is to be completed in ten months and will ply in the cargo and passenger trade between Seattle and southeastern Alaska.

It is understood that the steamboat inspection service in annual session at Washington recently, approved the Bullock Tell-Tale annunciator or safety system for steamboats, which has lately been installed on the Hudson River Day line steamboat Hendrick Hudson. The inventor is the Rev. C. S. Bullock, pastor of a church in Stratford, Conn.

Howard Gould's yacht Niagara narrowly escaped destruction in a collision with the three-masted schooner Harbeson-Hickman off Old Point Comfort recently. The Niagara attempted to cross the bow of the schooner and received a glancing blow at the stern carrying away her flagstaff and a portion of the rigging.

The Fore River Ship Building Co. has been awarded the contract for the fifth steel freight steamer for the Atlantic & Birmingham Construction Co., to be delivered within eleven months. This freighter is one of five, two of which have already been delivered by the Fore River Ship Building Co., which will run between New York and Brunswick, Ga.

The Toyo Kisen Kaisha (Eastern Steamship Co.) of Tokyo has contracted with Nagasaki yards for two sister ships of 13,000 gross tons each, and using oil for fuel, for its Hong Kong-San Francisco service. It is also reported that the company's three vessels, *Americamaru*, *Nipponmaru* and *Hong Kongmaru*, will likewise be fitted to burn oil fuel.

The navy department has under consideration the remodeling of the cruiser Brooklyn along the same lines as the work done on the cruiser New York. The Brooklyn is now in reserve at League Island and in event of congress appropriating \$500,000 for the purpose she will be given modern turrets and modern guns.

The Hart-Wood Lumber Co., of Aberdeen, Wash., has awarded contract to the Matthews Ship Building Co., Hoquiam, Wash., for another steam schooner to be 195 ft. keel, 39 ft. beam, and 12½ ft. depth of hold. Construction is to begin at once. The vessel is to be a sister steamer to the W. H. Murphy, now building at the same yard, and will cost \$110,000.

Liverpool is bestirring itself to provide improvements for the docking of large passenger liners, the Mersey docks and harbor board having under consideration the dredging of the river

to a greater depth. They have also approved an expenditure for constructing a new movable landing stage and improved electric lighting service is contemplated.

President Roosevelt recently sent a special message to the senate recommending an appropriation for the representation of the United States at the Interantional Maritime Exposition to be held at Bordeaux from May 1 to Oct. 31, 1907. The report of the acting secretary of state accompanying the message suggest the early appropriation of \$25,000.

The damage to the battleship Connecticut which struck a reef in entering Culebra Harbor recently, now appears to have been more serious than was at first admitted and the vessel will probably have to go into dry dock owing to some of her bottom plates having been bent upwards by the impact. The Connecticut is commanded by Capt. William Swift.

The Jamestown Steamboat Co., has been organized by the Norfolk, Va., interests to operate steamers between Norfolk, exposition grounds, Old Point, Newport News, Yorktown and Jamestown Island and for chartering steamers for special occasions. The company has already chartered the steamer *Rosedale* of New York with a capacity for 1,700 persons.

The Quintard Iron Works Co., New York, has obtained an order from the New England Navigation Co. for a new side-wheel passenger steamer for its Fall River line. The hull will probably be built by Cramps. The steamer will be 455 ft. long, 55 ft. beam, 95 ft. over all. The engines will be of the double inclined, compound type, developing 11,000 horsepower.

The new freight steamer Pawnee was launched Jan. 28 from the yard of Harlan & Hollingsworth, Wilmington, Del. The vessel is intended for the 20-hour freight service of the Clyde line between New York and Philadelphia. She is 267 ft. in length, 40 ft. beam and 24½ ft. deep. She is fitted with one engine, 19, 30 and 50 in. by 30 in., and two boilers 12½ by 11 ft.

With the completion of the Tehauntepec National Railway Co.'s new inter-oceanic route across Mexico comes the announcement by the American-Hawaiian Steamship Co., of New York, of the inauguration by them of steamship services from New York to Coatzacoalcos, the Atlantic terminal of this railway, and also between Salina Cruz the Pacific coast terminal, and United States Pacific coast ports, and the Sandwich Islands.

The lumber cargo shipments from Washington, Oregon and British Columbia ports during the year 1906 amounted to 1,567,743,566 ft. as compared with 1,087,976,489 ft. of the previous year which itself was the high record up to that time. The foreign lumber cargoes for 1906 totaled 308,697,321 ft. The lumber shipments for the year to California from Washington and Oregon mills aggregated 1,079,459,353 ft.

The Union Iron Works has been compelled, owing to the scarcity of skilled labor, to ask the government for a further extension of the time to complete the armored cruisers California and South Dakota, desiring to deliver the former April 30 and the latter June 30. It is unlikely that an adjournment will be permitted beyond April 1 and June 1, respectively. Both vessels are to be put in commission immediately upon delivery.

The Sierra Leone, a sister ship to the Aburi, was recently completed by Harland & Wolff for the African Steamship Co. (managing agents, Messrs. Elder, Dempster & Co.). The two vessels are identical in size and general arrangements, being 370 ft. long, 49 ft. beam, 25 ft. 4 in. depth, and of 3,800 tonnage. The vessels have twin screws and three-cylinder triple expansion engines. They will be used in the West African trade, carrying both passengers and cargo.

It has been announced by Admiral Mirabello, Italian minister of marine, that the armor-plate factory at Terni, Italy, has taken a contract to provide the Italian navy with 6,000 tons of armor plate, at the same price as that at which the Midvale Steel Co.'s contract with the Italian government was made, resulting in a saving of \$80,000. The construction of another battleship of 15,000 tons has been ordered, and others of the same class are contemplated upon its completion.

The new steamer De Greve built by the Blyth Ship Building Co., to the order of Messrs. Koninklijke Paketvaart Maatschappij, Amsterdam, was given her sea trial recently, proving very satisfactory in every way. The vessel is 343 ft. long, 47.3 ft. beam and 24.5 ft. deep, built to Lloyds highest class. The Northeastern Marine Engineering Co., Wallsend, supplied her with triple expansion engines, cylinders 24, 38 and 64 in. by 42 in. stroke, and two boilers.

It is estimated that the repairs to the steamers of the Pacific Mail Steamship Co., recently stranded, will, in the case of the Manchuria aggregate \$300,000, while repairs to the Mongolia will cost \$150,000. Both vessels being at San Francisco, and there being but one dock of

sufficient size to accommodate them, the Mongolia is being repaired temporarily and will resume service until the Manchuria is released, which will be about seven months. The Mongolia's repairs will take four months' time.

An investigation by the court of inquiry into the sinking of the French submarine *Algerien* develops the conclusion that, the submarine being moored fore and aft to the battleship *Dupleix*, the forward hawser made fast to the battleship's anchor chain, that the falling tide drew this hawser taut and the submarine was tilted until water rushed in through the half open hatch in the conning tower. The after hawser snapped under the great weight, thus sinking the vessel.

The steam lighter *Eversley Childs*, built by Rodermond Bros., Tompkins Cove, N. Y., from designs of Sadler, Perkins & Field, and recently placed in commission, has been pronounced a success. She is 86 ft. over all, 79 ft. between perpendiculars, 27-ft. beam and 8-ft. 8-in. depth. The machinery comprises one vertical steeple compound engine, cylinders 12 in. and 25 in. by 18 in. stroke, of about 250 I. H. P., built by the F. A. Verdon Co., New Brighton, S. I. The boiler is 6 ft. in diameter by 9 ft. in length, with a working pressure of 150 lbs.

The Nippon Yusen Kaisha has thirteen new ships under construction, of which three are being built in England—one of 2,000 tons and two of 2,500 tons each—to be used on the Shanghai line. The Kawasaki Dockyard Co. Ltd., of Kobe, is building five vessels, four of 3,500 tons each and one of 8,600 tons. The Mitsu Bishi Yards, Nagasaki, is also building five ships, four of 8,600 tons each and one of 6,500 tons. At the Kawasaki yard two of the ships are building for the European line and those of 3,500 tons are for the Yangtze river line.

The United Transportation & Lighterage Co. has recently placed in commission at Philadelphia two unique gasoline-propelled lighters. They are of steel and are of the following dimensions: 100 ft. between perpendiculars, 110 ft. over all, 23.5 ft. beam and 7.4 ft. depth of hold. The motive power consists of two Globe gasoline engines of 50 H. P. each, manufactured by the Pennsylvania Iron Works Co., Philadelphia, and which turn three-bladed bronze screws of 42 in. diameter and 54 in. pitch. The vessels were built at the yard of John H. Dialogue & Son.

The house committee on naval affairs recently voted upon the increase in the navy, and agreed to a recommendation of two big battleships, one of which, however, is the ship for which plans were submitted to con-

gress at the opening of the session. The committee also voted to recommend that the amount for submarine torpedo boats, which was \$1,000,000 in the bill last year, be increased \$3,000,000. The total appropriation is approximately \$95,000,000. The bill adds approximately 1,500 sailors and 800 marines to the service.

Effective Jan. 1, the following changes are noted in the personnel of the combined Mallory, Clyde, Eastern, Peoples', Troy and Metropolitan lines: Charles C. Brown, appointed general passenger agent of the above lines; A. H. Hanscom, general passenger and ticket agent of the Eastern Steamship Co. has resigned to devote his entire time to his duties as assistant to the president; J. H. Allaire, general passenger agent of the Peoples' line, has resigned to accept other service with the company; R. L. Hornby, general passenger agent of the Troy line, has resigned to accept other service.

It is understood that the marine policies covering merchandise on the wharves and in warehouses at Kingston did not carry the earthquake exemption clause as did the fire policies, thus subjecting the marine underwriters to heavy losses. The total loss by fire and earthquake has been estimated as high as \$32,000,000, and the aggregate of risks carried by fire insurance companies in Jamaica amounts to \$7,500,000. It has been stated by the insurance correspondent of the London *Times* that London underwriters offered some time ago to insure Kingston property against all damage by earthquake, including fire, but the offer was not accepted.

A bill has been introduced in the senate providing for a thorough test of all life-boats now in use on United States vessels, including in its requirements examination into weight, material of which boats are built, size, capacity, facilities for safety in detaching, protection of passengers from weather, provisions against capsizing and, if self-righting, the causes for same. The bill also provides for the notification of lifeboat builders to bring their boats to the Jamestown (Va.) Exposition at their own expense, where the tests and examinations will take place.

The Central & American Telegraph Co. through its president, James A. Scrymser, has made application to the war department for permission to land a cable at San Juan, Porto Rico, and also at Colon on the isthmus. The plan is to lay the cable and then connect the Atlantic and Pacific cables by a telegraph line from Colon to Panama. The war department desires an all-American cable from the isthmus

to Cuba, Porto Rico and the mainland as in case of war such a connection would be extremely valuable, and Secretary Taft has the proposition under consideration.

It is reported that if the Japanese government's present plans mature her navy will in 1905 be double in efficiency what it was at the beginning of the conflict with Russia.

The Rock Island-Frisco lines are planning to build immense docks and terminals at Galveston involving an expenditure of \$5,000,000. There will be three piers 2,000 ft. long and 300 ft. wide, affording berths for 30 vessels.

Secretary of the Navy Metcalf, in speaking to the midshipmen of the second section of the class of 1907, graduated at Annapolis Feb. 11, said that a powerful and well equipped navy with plenty of battleships was the surest guarantee of peace and that the big, heavily-armed vessels must be the mainstay of future naval engagements.

The Niles-Bement-Pond Co., of New York, has been awarded the contract for two traveling cranes for the Portsmouth navy yard at \$18,000. The following awards were recently made for supplies for the navy yards: The Wonham-Magor Engineering Works, New York, self-dumping steel cable cars, \$7,625; M. T. Davidson, Brooklyn, N. Y., two vertical single-cylinder steam pumps, \$196; the Tabor Mfg. Co., Philadelphia Co., one Tabor Newbold high-speed saw, \$110; Farnum Sand Blast Co., New York, one sand blast, \$250; Garvin Machine Co., New York, screw cutting engine lathe, \$1,025; the Smith-Courtney Co., Richmond, Va., one improved planer chuck, one emery tool grinder, one power saw and one drill grinder, \$213.70.

That the battleship and the armored cruiser must before long be merged into a single type, the battle cruiser, is the belief of the chief constructor of the French navy. This resultant concentration of great attack and defense with extreme speed will, he believes, be found illustrated, say in 1915, in a vessel of 25,000 tons mounting a unit battery of high caliber guns and developing a speed of not less than twenty-two knots. The French constructor is also persuaded that any navy now bold enough to lay down battleships of 25,000 tons' displacement will by one stroke secure a tremendous advance over all its rivals, because a squadron of four such vessels will greatly outclass six battleships less effective in the energies that can be assembled.



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February 21, 1907.

OUR MERCHANT SHIPS.

Announcement comes from the Pacific that the steamers Lyra, Pleiades and Hyades, belonging to the fleet of the Boston Steamship Co., would be withdrawn permanently from the Oriental run, owing to lack of encouragement from the general government. These steamers were built at a time when it was believed that the government would come to the rescue of shipping in the foreign trade. Practically a definite promise was made at the time that American ships operating in the over-sea trade would be assisted by the government, but the promise was never kept. These ships have made a loyal effort to keep the American flag afloat on the Pacific, but apparently without success. Since they were abandoned by the government, not a single ship has been built in the United States

for foreign trade, except two steamers for the Ward Line, which receive a moderate subvention for carrying mails to the West Indies and Mexico under the postal act of 1891.

The present bill before congress to remedy in part this deplorable condition is a very moderate measure and in all conscience should be passed. The present state of things is a shame. The country is so vast, so resourceful, so self-contained, so complete in itself under all normal conditions that it is blinded to a distressing circumstance which has in it the potentiality of grave danger. Provided we are willing that the foreigner should reap the profit, the over-sea commerce of the country can be carried in foreign ships in times of peace very well; but how about times of war? A clash between Great Britain and a continental power would stagnate our foreign commerce. Moreover, how are seamen to be got for our naval vessels if we have no merchant ships upon which to train them? We are building up a great navy, a navy rapidly becoming second to Britain's, and all the time the cry is for men. It is difficult to understand the government's attitude toward its merchant marine. To try the experiment of governmental aid contained in the present bill would not cost as much as it does to build a single battleship. Why is this niggardly policy pursued towards the merchant ship? The merchant ship is of primary importance; the naval ship of secondary account; yet towards the navy a policy of magnificence is observed and towards the merchant ship one of parsimony.

SECTION 42 OF THE IMMIGRATION ACT.

The effect of Section 42 of the new Immigration Act which has just passed both branches of Congress is an increase after Jan. 1, 1909, by nearly 25 per cent in the minimum space allowed for each steerage passenger on ocean steamers coming from Europe, Asia, Africa, Australia and South America. On the decks where steerage passengers are mainly carried the law of 1882 requires that there shall be 100 cubic feet of space for each passenger. As the height between decks is usually about 7 feet, the deck or floor space allowed is thus 14.4 sq. ft. The

British law of 1894 requires 15 sq. ft. on the deck, and the new immigration law increases this area to 18 sq. ft. The legislation in effect follows the developments in modern ocean steamship building. In 1882 when our present law was passed the Servia, 7,392 gross tons, was the crack trans-Atlantic liner. Ten years ago the Lucania, 12,952 gross tons, was the largest ocean steamship, and there were only 10 ocean steamships of over 10,000 gross tons. Recently the two new Cunarders of 32,000 gross tons each have been launched and there are now 102 steamships over 10,000 gross tons each, the majority of which are engaged in the immigrant business to the United States. Many of these large steamers and some of less tonnage already provide accommodations as ample as the minimum prescribed by the new act. Thus during the past fiscal year 175 steamships brought steerage passengers into the port of New York. The maximum number which they were all allowed to carry (one trip each) was 254,712. The maximum number which these same steamers would be allowed to carry under the new act is 203,769. The maximum number which they did carry (taking the voyage when the largest number was carried) was 193,724. Of the entire number 100 carried no more on any voyage last year than they are allowed to carry under the new law. On one or more voyages 75 steamers carried more than would be permitted under the new legislation.

Generally speaking, the passenger steamers from northern Europe do not carry any more passengers in the steerage than will be permitted after 1909 under the new legislation. The bill will apply chiefly to steamers coming from the Mediterranean, which already carry at times nearly to their full legal capacity and must two years hence either carry fewer passengers or increase their accommodations. Substantially, Section 42 takes standards of accommodations already voluntarily established by some of the principal steamship lines and requires other steamship lines to bring their accommodations up to such standards.

Of fifty-six steamships arriving at New York with steerage passengers during January, 1907, nine carried more than would be allowed under the new law.

CLEVELAND-CLIFFS APPOINTMENTS.

J. H. Sheadle, secretary of the Cleveland Cliffs Iron Co., announces the appointments of masters and engineers of the vessels operated by the company as follows:

CLEVELAND-CLIFFS IRON CO., CLEVELAND, O.		
Master.	Vessel.	Chief Engineer.
Capt. J. M. Johnston.....	William G. Mather.....	E. L. Jenkins
Capt. H. H. Parsons.....	J. H. Sheadle.....	C. H. Menmuir
Capt. C. E. Sayre.....	Ishpeming.....	A. G. Bohland
Capt. S. A. Lyons.....	Michigan.....	Wm. Naylor
Capt. C. R. Nev.....	Pontiac.....	H. J. Hawthorne
Capt. F. D. Perew.....	Frontenac.....	T. J. Rees
Capt. Geo. Trimble.....	Cadillac.....	
Capt. W. H. Hoffman.....	Choctaw.....	W. B. Rowe
Capt. James Kennedy.....	Andaste.....	
Capt. I. A. Stewart.....	Pioneer.....	D. J. O'Brien
Capt. R. A. Gaskin.....	Falcon.....	Charles Gregory
Capt. M. J. Pidgeon.....	Chattanooga.....	

CLEVELAND-CLIFFS IRON CO., CLEVELAND, O.,
MANAGERS FOR THE PRESQUE ISLE TRANSPORTATION CO.

Capt. S. N. Murphy.....	Peter White.....	F. V. Barry
Capt. F. A. West.....	Presque Isle.....	Bernard Henry
Capt. T. E. Murray.....	Angeline.....	S. G. Cowell

CLEVELAND-CLIFFS IRON CO., CLEVELAND, O.,
MANAGERS FOR HOPKINS STEAMSHIP CO.

Capt. C. A. Anderson.....	Centurion.....	J. B. Hart
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IRON SITUATION.

An inquiry for shapes and plates for three lake vessels for 1908 delivery appeared in the iron and steel market during the past week. Both specifications and new business in steel and iron bars are very satisfactory. The price of boil-

GILCHRIST ENGINEERS.

James Mitchell, fleet engineer of the Gilchrist Transportation Co., has appointed the chief engineers for the fleet as follows:

STEAMER.	ENGINEER.
Case.....	Frank Hawthorne
City of Genoa.....	Walter Patterson
City of Naples.....	Lewis Fetting
City of Rome.....	Marcus Hill
Colonial.....	Carl Becker
Cumberland.....	William J. Nolan
C. W. Elphicke.....	Peter Britz
Gilchrist.....	W. T. Schwacofer
J. C. Gilchrist.....	John Parks
F. W. Gilchrist.....	Henry Jesson
General Garretson.....	H. L. Mitchell
C. C. Hand.....	F. O. Burrows
John Harper.....	
F. W. Hart.....	C. J. Erickson
F. J. Hecker.....	A. L. Hatch
Helena.....	William Sicken
Hiawatha.....	C. T. Martin
R. L. Ireland.....	James S. Balfour
Jupiter.....	T. F. Higgins
Lake Shore.....	George Zanger
Lansing.....	I. R. Engert
Mars.....	Porter Robertson
H. P. McIntosh.....	A. F. Hogle
Massachusetts.....	Gordon Potter
Thomas Maytham.....	Daniel Flint
Mecosta.....	Nelson Lockhart
Merida.....	Charles Burns
Merrimac.....	F. Ouellette
Neosho.....	Calvin Hatch
Neptune.....	Otto Elsholz
Neshota.....	August Dumer
Alexander Nimick.....	D. M. Foster
E. W. Oglebay.....	Thomas Harringer
Olympia.....	Peter LaMar
F. M. Osborne.....	William Brake
E. R. Rhodes.....	Guy Squire
George H. Russel.....	John Maher
Saturn.....	D. L. Brown
E. N. Saunders.....	Martin Mitchell
R. E. Schuck.....	Joseph Barney
John Sherwin.....	T. A. Francombe
H. S. Sill.....	Thomas Burns
Steel King.....	Burt Beauchamp
Tacoma.....	Peter Robertson
C. Tower.....	E. Ellsworth
Uranus.....	T. F. Birch
Venus.....	John Conley
Vermilion.....	George B. Eaton
Volunteer.....	H. W. Barden
Vulcan.....	Robert Doran
P. G. Walker.....	John Seymour
Wallula.....	Thomas Morrill
C. W. Watson.....	L. J. Manlon
I. L. Weeks.....	R. H. Reynolds
D. C. Whitney.....	Marcus M. Barns
D. M. Whitney.....	C. A. Francombe
George F. Williams.....	Harry Stone
J. B. Wood.....	John C. Fritz
Lewis Woodruff.....	A. McLaren
A. P. Wright.....	August Lembke

BARGES.

Antrim.....	William Marshall
Tyrone.....	

It will be observed that the two new steamers, General Garretson and H. P. McIntosh, will be in charge of H. L. Mitchell and A. F. Hogle.

ENGINEERS APPOINTED.

Fleet Engineer E. Hull of the United States Transportation Co.'s fleet has appointed the following chief engineers:

Steamer.	Engineer.
Harry Coulby.....	John Davidson
Lyman C. Smith.....	Wm. Roach
New steamer.....	E. H. Reading
John B. Cowle.....	Charles Couchaine
L. C. Smith.....	John Churchill
A. G. Brower.....	John Schirg
Hurlbut W. Smith.....	Charles Wilson
Nottingham.....	Charles Wiltoncox
George B. Leonard.....	Wm. Beckhisinger
Monroe C. Smith.....	Benjamin Hilsa
B. Lyman Smith.....	H. G. Gregg
Wilbert L. Smith.....	John Taylor
W. W. Brown.....	George Nerreter
Charles M. Warner.....	Charles T. Hull
H. S. Wilkinson.....	Malcolm McNeal
Wm. H. Gratwick.....	Allen Landsphere

The steamer Winnebago, recently sold to San Francisco interests, will be altered to suit salt water conditions before she leaves Superior. Her pilot-house will be shifted aft and the surface condenser fitted in the engine-room.

THIRD LOCK AT SAULT.

An agreement has been reached in the conference committee upon an amendment to the river and harbor bill which it is thought will prevent any delay in the construction of the third lock at Sault Ste. Marie. This agreement is embodied in an amendment which is proposed by Senator Frye, chairman of the senate committee on commerce. In his amendment Senator Frye follows closely the law by which railroads condemn property in Ohio. The government will be authorized to take possession of the property necessary for the construction of the new lock and the valuation of it is to be determined by appraisers. If the owners of the property are not satisfied with the valuation fixed by the appraisers they are allowed an appeal to the courts. This appeal will not prevent the government from proceeding with the work on the lock. It is possible that litigation growing out of the water power rights at the Sault may be pending long after the lock is completed.

"In my opinion," said Harvey Goulder, who is in Washington, "the amendment proposed will prove a satisfactory solution of the difficulties. It appears to me that all of the interested parties will have ample protection by this amendment and at the same time the work on the lock will not be delayed on account of any litigation that may grow out of the work of obtaining possession of the property along the St. Mary's river."

er tubes has been advanced \$4 on base sizes. In finished lines, specifications are being received in very large volume and new business in nearly all products is satisfactory, although some structural mills are anxious to obtain some orders before the spring rush sets in. Indications of a downward tendency in pig iron prices, noted last week, are not so strong at present, though the position of buyers of steel-making iron in insisting upon a \$20 quotation is still firmly maintained. Independent manufacturers of finished products, particularly of sheets, are not buying any more crude steel than is absolutely necessary. The United States Steel Corporation has placed an order aggregating 9,300 tons of low phosphorus iron for delivery in June, July and August.

BECKER ENGINEERS.

The following chief engineers have been appointed for the steamers managed by W. H. Becker of which William Hill is fleet engineer:

Steamers.	Engineers.
B. F. Jones.....	C. B. Culver
James Laughlin.....	William Millington
W. G. Pollock.....	Ed. Reilly
I. W. Rhodes.....	I. H. Norton
F. L. Robbins.....	James Connors
F. Widlar.....	George L. Allen

Mr. Harry Coulby, president and general manager of the Pittsburg Steamship Co., sailed for Liverpool on Saturday last on the Cunard turbine liner Carmania.

The local managers of the Great Lakes Towing Co. have been in conference during the present week at Cleveland.

DECISIONS WHICH AFFECT SHIPPING INTERESTS.

COLLISION IN FOG.—A steamship, after passing out to sea from New York bay through Gedney channel, stopped to discharge her pilot some 800 to 1,000 feet outside of the entrance to the channel, which is about 1,150 feet wide. She lay to the north of the center of the channel extended, so that both she and the pilot boat which lay near were in the usual pathway of vessels approaching to enter the starboard side of the channel; her position being such that she presented an obstruction some 200 feet in width to an approaching vessel. There was a dense fog, and another steamship approaching to enter the channel at an excessive speed came into collision with her. Under these facts the United States district court of New York, southern division, held that while it would have been a more prudent course for her to keep to the south side of the channel extended, or to go entirely outside of it, yet, being in the open ocean, her failure to do so did not constitute a fault which contributed to the collision, and that she was not liable therefor, no other fault being shown.

The case also holds that a steamship navigating in a fog at such a rate of speed that when another vessel, which was practically motionless, came into view, she was unable to stop in time to avoid collision, was in fault for excessive speed.

LOSS OF TOW FROM MUTUAL FAULTS.—A tug which undertook the towage of two scows from Charleston to Baltimore, carried but one hawser, which parted twice in calm weather, and owing to the consequent delay the tow encountered a storm when at a dangerous part of the coast, during which the hawser parted a third time, and the scows were lost. In a suit to recover for loss of the scows the United States district court for the eastern district of Virginia held that the tug failed in her duty in using a hawser which was not in a suitable and sound condition, and in not being provided with an extra one for such a voyage; that the owner of the scows was also chargeable with fault contributing to the loss, in that they were not sufficiently seaworthy for the voyage, but leaked and were largely filled with water before the last breaking of the line, in consequence of which mutual faults the damages should be divided.

SEAMAN'S LIEN FOR WAGES.—The United States district court for Indiana holds that seamen having liens for wages, on a vessel which was sunk, are entitled to enforce the same against insurance money paid on account of the loss to the owners or their assignees, subject only to claims for salvage service in raising and preserving the vessel, where the pro-

ceeds of the vessel when sold are insufficient to pay the same. The case also holds that liens on a vessel for seamen's wages or supplies, given by the maritime law, or by state laws, have priority over mortgages.

RIGHTS AND LIABILITIES OF PART OWNERS OF VESSELS (continued).—In the United States the majority in interest of the part owners control and may employ the ship as they see fit, subject to the rights of a dissenting minority part owner to compel the giving of a stipulation by the majority so desiring to employ the vessel by which they bind themselves to effect its safe return, or in case of loss to reimburse the minority for the loss of their shares. If the majority refuse to employ the vessel, a court of admiralty will deliver its possession to the other part owners willing to employ it. The rights of the majority in such case find ample protection in the power of the court, on application being duly made, to compel the part owners who are sailing the vessel to give a stipulation for its safe return, such as is ordinarily given the dissenting minority.

Still another case in which the right of part owners as between themselves to determine the employment of the ship arises where the disputant parties own equal interests. Where the question at issue in such case is whether the ship shall or shall not be employed, the interest desiring its employment is entitled to possession and control as against the interest seeking to keep it in idleness. Where the conflict between an equality of interests is not as to the employment or nonemployment of the vessel, but where each of the parties is equally willing to employ it, differing only as to the nature of such employment, the law does not presume to decide upon the merits of the controversy and award possession to one or the other accordingly. Neither is in such case entitled to preference, and the remedy, if any exist, is to be found in a sale of the vessel.

Not infrequently the bone of contention between part owners is the appointment of a master, rather than the advisability of a particular voyage. In such cases the rules above laid down with reference to the general management of the ship control. The part owner or owners entitled to direct the employment of the vessel are as an incident to that general power entitled to appoint and discharge its master and its crew. The right of the majority in interest to remove a master who is himself a part owner arises in this connection. In this country the uniform weight of authority is to the effect that the fact that the master is a part owner cannot affect the right of the majority to remove him at will, and the existence of any such thing in law as a "sailing or master's interest" is quite

uniformly denied. The union of the position of master and the relation of part owner in the same person gives such person no peculiar rights in the control of the vessel, and unless he controls one-half or more of the shares in the vessel, he may be removed from his position of master at the will of the majority, and though no cause for removal is assigned.

This power of the majority to appoint and remove the master is held to be burdened with a trust to exercise it for the benefit of other part owners, and its exercise in a free and impartial manner a service of such public concern, that any contract by which such control is surrendered indefinitely is regarded as against public policy and void. A contract that the right of appointing the master shall attach to a particular share or to continue a certain person in that position is of this nature, and unenforceable.

The bond which is required of the part owners employing the vessel against the wishes of certain of their co-owners is merely a bond for the safe return of the vessel. It should not be in the form of a bond to answer judgment in the action of restraint, nor should it guarantee the dissenting owner against liabilities which may be incurred by the vessel before her safe return, nor for expenses advanced and against further loss. Where a part owner dissenting from a voyage which his co-owners are about to undertake applies for and secures a stipulation by them for the safe return of the vessel, the voyage so undertaken is made entirely at the risk and for the benefit of his co-owners. He is not chargeable with liabilities incurred, nor is he entitled to any profits earned in that adventure, and his co-owners are not liable to him for the use of his share of the vessel.

THE RICHELIEU & ONTARIO NAVIGATION CO.

At the meeting of the shareholders of the Richelieu & Ontario Navigation Co. on Feb. 12 the directors submitted a very favorable report for the past year. The gross earnings amounted to \$1,366,299.21 or an increase of \$148,925.60 over 1905, and the net profit after providing for fixed charges, interest, etc., was \$261,040.19. The operating expenses including extraordinary repairs, were 79.70 per cent of the gross earnings. A dividend of 1¼ per cent, amounting to \$39,150 was paid Dec. 1, being at the rate of 5 per cent per annum. The bond issue, originally \$571,833.33 now stands at \$323,146.71, the company having redeemed \$28,266.64 of the issue during 1906.

The steamer Quebec has been

lengthened and remodeled and the Rapids steamer Rapids King launched, both of which vessels are to be in commission the coming season. The construction of two other vessels is contemplated. The sum of \$36,000 has been set aside out of the year's earnings as an insurance fund.

NAVAL APPROPRIATION OF \$95,000,000.

An appropriation of about \$95,000,000 is provided for in the naval appropriation bill agreed upon recently by the house committee on naval affairs. The bill provides for an additional battleship, two torpedo boat destroyers, and appropriates \$2,000,000 for submarines. This \$2,000,000 is additional to the \$1,000,000 for submarines provided last year, which has not yet been expended. Provision is made for about 3,000 additional sailors and 900 additional marines. The rank of the commandant of marines is raised from brigadier general to major general.

The new battleship provided for is to be a sister ship of the monster authorized by congress last year, which the bill required should be "a first-class battleship, carrying as heavy armor and as powerful armament as any known vessel of its class, to have the highest practicable speed and greatest practicable radius of action."

Last year's bill provided that plans for such a ship should be submitted to congress, and the navy department sent these plans to the capital early this session. The cost of these two battleships is estimated at \$10,000,000 each.

REVENUE CUTTER BIDS REJECTED.

Washington, D. C., Feb. 13.—Because none of the bids on the revenue cutter which is to be built under the last appropriation of congress complied with the specifications as to delivery, the secretary of the treasury has readvertised for bids. According to the advertisements the new bids are to be opened Feb. 26. In response to an urgent appeal from the Pacific coast congressional delegation the secretary of the treasury in the specifications for the first bids required Puget Sound delivery. It was expected that the Pacific coast ship yards would take advantage of this specification bid for the cutter. But the result was disappointing as there were no bids from the coast. In the new specifications yard delivery is required. This places all ship yards on the same basis. The limit of cost for the ship is \$160,000.

SHIPMASTERS' LICENSES.

A bill introduced by Mr. Waldo, of New York, was recently reported out of the house committee on merchant marine and fisheries, which amends the revised statutes relating to licensed masters, mates, engineers, and pilots. It reads as follows:

"Every master, mate, engineer, and pilot, who shall receive a license shall, when employed on any vessel, within forty-eight hours after going on duty, place his certificate of license, which shall be framed under glass, in some conspicuous place in such vessel where it can be seen by passengers and others at all times. Provided in case of emergency, such officer may be transferred to another vessel of the same owners for a period not exceeding forty-eight hours without the transfer of his licenses to such other vessel, and for every neglect to comply with the provision by any such master, mate, engineer, or pilot, he shall be subject to a fine of one hundred dollars or to the revocation of his license."

It is stated in the report that it is practically impossible to comply with the present statute in large ports. Ferry lines, tow boats and lines of steamers running to nearby ports usually have many vessels engaged in the traffic, and in the case of sickness or injury it is frequently necessary to transfer officials or employes from one boat to another. Without this, boats would frequently be tied up, greatly to the inconvenience of travel.

The merits of the bill seem to be without question, and those back of it are confident that it will receive prompt attention. It has been recommended by the department of commerce and labor and a letter to that effect is appended to the report.

TOO MANY NAVY YARDS.

So much dissatisfied are the members of the naval affairs committee of the house, as well as several other congressmen interested in naval matters, with the present management of the navy yards that they are planning to send the naval officers stationed in them back to their ships and put the navy yards into the hands of civilians who know something about business.

The committee estimates that \$1,000,000 can be saved annually by consolidating the various bureaus. It is likely that committee will recommend that next year civilians be put at the head of the construction work. Chairman Foss expressed the opinion that such a plan not only would give back to the navy 200 officers, of which it is in great need, but would greatly reduce the expenses of the navy yards.

"This matter is only in its formative stage, however," he said. "It is unquestioned that naval officers are more valuable to the government when they are at sea, their natural element, than when doing shore duty. If the present plan is carried out, we would authorize the navy to hire trained civilians to be put in charge of all construction work at navy yards. Naval officers could continue to perform the military functions of the yards, and they would be detained as designers and inventors, but the work they mapped out, we believe, could be done better if it were turned over to civilians for execution."

Some members of the committee are of the opinion that there are too many navy yards, and are in favor of abolishing those at Portsmouth, N. H., Philadelphia, Charleston, Washington and New Orleans, and concentrating all the work at Boston, Brooklyn, Norfolk and Pensacola.

TURBINE CHANNEL STEAMERS.

There will soon be a notable fleet of turbine steamers in the English channel as the two turbine steamers which Messrs. Denny & Bros., Dumbarton, are building for the South-eastern & Chatham railway, will be ready for service in the summer. The London & Southwestern and the Great Eastern railways are seriously considering turbines as a means of propulsion for their next new steamers, and the Zeeland company, now running paddle-wheel steamers between Queensborough and Flushing, will likely build an experimental turbine steamer when the paddle boats are superseded. For channel service turbines are much superior to reciprocating engines, although the advantage is not so marked in the 18-knot boats as it is in the boats whose speed is over 21 knots.

The bid of the International Contract Co. of Seattle was the lowest submitted for a dredge to be used at Panama.

The schooner Casco, which carried Robert Louis Stevenson on his voyage through the south seas, went ashore at San Quentin Bay and will prove a total loss. She was owned by the Victoria Sealing Co.

The Richelieu & Ontario Navigation Co. has under consideration the building of a new passenger steamer for its Rapids service. The vessel is to be a sister ship of the Rapids King and will probably be named Rapids Queen. The company also contemplates building a freight and passenger steamer for its Hamilton line.

LAKE SHIPYARD METHODS OF STEEL SHIP CONSTRUCTION.

BY ROBERT CURR.

The construction in Scotland is somewhat different than the great lakes in the greater part of the vessel.

Fig. 156 shows the center girder and keel plate erected in place and riveted. The riveting is done by hydraulic machines, which is considered better for

156 is flush on the under side the entire length of the vessel, which is considered a great convenience in docking the vessel. The keel is built up of three thicknesses of plating 55 in. wide with a combined thickness of three inches.

The center keelson is five feet deep, over one inch thick and fastened to the keel plate and tank top with heavy angles.

The keel plating is reduced at the for-

the cranes as shown on Fig. 157.

In erecting the floors which are completed and lying along the ground at the ship's berth the movable cranes are used for that purpose, as shown by Fig. 157 on each side of the keel.

The frames, it will be seen by Fig. 157, are in two pieces on each side of the center keelson in way of the engine, as the water bottom is carried up higher on the ship's side, the tank margin in way of same becoming a girder.

Fig. 158 shows the forward part more fully completed, with some of the tank top plating on, also the margin angle and clips for top side frame brackets.

In the process of getting the bottom framing in place a ribband is run just immediately under the margin plate shown by Fig. 157 and shored up to the height so that when the frames are erected they rest upon the ribband and are supposed to be in place. At the ends where the floors are shorter the ribband is put on after the floors are in place and not until the ribbands are fastened to the frames and line of the bottom checked is the bottom work proceeded with. All the work with the exception of the keel and center keelson are marked from the ship and erected as soon as the bottom is faired up.

Fig. 158 shows the result of all these

TABLE I.
Table showing diameter and length of rivets, butt straps and overlapped joint breadths for various weights of plates.

Weight in lbs. per sq. ft.	12.5	15	17.5	20	22.5	25	27.5	30	32.5	35	37.5	40
Diameter of Rivets	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{7}{8}$	$\frac{7}{8}$	$\frac{7}{8}$	$\frac{7}{8}$	1"	1"	1"
Length of rivets counter-sunk points	1 $\frac{1}{8}$	1 $\frac{1}{4}$	1 $\frac{1}{8}$	1 $\frac{1}{2}$	1 11-16	1 15-16	2 3-16	2 $\frac{3}{8}$	2 $\frac{1}{2}$	2 $\frac{3}{8}$	2 $\frac{3}{4}$	2 $\frac{3}{8}$
Length of rivets snap points	1 $\frac{1}{2}$	1 $\frac{3}{4}$	1 $\frac{3}{4}$	2	2 3-16	2 $\frac{3}{8}$	2 $\frac{3}{8}$	2 $\frac{3}{4}$	2 $\frac{7}{8}$	3	3 $\frac{1}{8}$	3 $\frac{1}{4}$
Breadth of III straps				14 $\frac{1}{4}$	14 $\frac{1}{4}$	16 $\frac{3}{4}$	16 $\frac{3}{4}$	16 $\frac{3}{4}$	16 $\frac{3}{4}$	19	19	19
II straps	8	8	9 $\frac{3}{4}$	9 $\frac{3}{4}$	9 $\frac{3}{4}$	11 $\frac{1}{4}$	11 $\frac{1}{4}$	11 $\frac{1}{4}$	11 $\frac{1}{4}$			
III butt laps				12	12	12	12	12	12	14	14	14
III butt laps			7 $\frac{1}{2}$	7 $\frac{1}{2}$	7 $\frac{1}{2}$	9	9	9	9	10 $\frac{1}{2}$	10 $\frac{1}{2}$	10 $\frac{1}{2}$
II butt laps	4 $\frac{1}{2}$	4 $\frac{1}{2}$	5	5	5	6	6	6	6			
III edge laps									7 $\frac{1}{2}$	8 $\frac{1}{2}$	8 $\frac{1}{2}$	8 $\frac{1}{2}$
II edge laps	3 $\frac{3}{4}$	3 $\frac{3}{4}$	4 $\frac{1}{2}$	4 $\frac{1}{2}$	4 $\frac{1}{2}$	5 $\frac{1}{4}$	5 $\frac{1}{4}$	5 $\frac{1}{4}$	5 $\frac{1}{4}$	6	6	6
I edge laps	2 $\frac{1}{4}$	2 $\frac{1}{4}$	2 $\frac{1}{2}$	2 $\frac{1}{2}$	2 $\frac{1}{2}$	3	3	3	3			

closing up the material than the air. The riveters will close the material up by placing the dies of the machine on the material which acts similar to a clamp seeing the machine spans the center keelson, as shown on Fig. 156.

The same power is used as if a rivet were to be driven, then the bolts at

ward and after ends. The keel plating and center keelson is erected with a movable crane, as shown on Fig. 156.

Fig. 157 shows the bottom framing with margin plates on from the fore end of the engine room to the after end of

TABLE 2.
MINIMUM NUMBER OF RIVETS IN EDGES OF PLATING AMIDSHIPS INCLUDING RIVETS IN FRAMES.

Spacing of Frames.	Number of Rivets in Each Row.	Diameters.	1"
18	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$
24	4 $\frac{1}{2}$	7	6
36			9

either side of the machine are tightened up, which takes up any loose material. This, of course, suits the system, because the riveters are responsible for bolting and closing up the material, while on the great lakes the work is all bolted up and ready for the riveters to proceed with their work. The closing up with the machine is not necessary on the great lakes.

The vessel shown in this article is very much heavier than the one built on the great lakes and referred to in these articles. But will serve the purpose of describing the method practiced in Scotland seeing it is of a late issue.

This vessel is 672 ft. 6 in. by 72 ft. by 52 ft., and in the construction of same 12,000 tons of steel is used, with 1,800,000 rivets to fasten same.

The great lakes vessel, 552 ft. by 56 ft. by 31 ft., has 3,600 tons of steel in construction and 550,000 rivets.

The time from when the keel was laid until launched in Scotland was one week less than a year, and on the great lakes seven and one-half weeks.

The keel of the vessel shown in Fig.

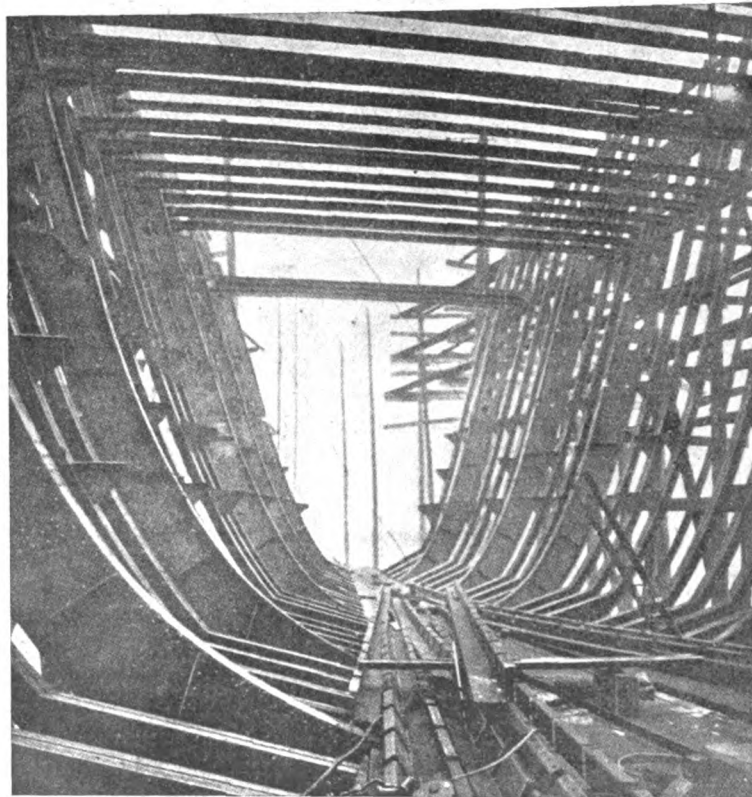


FIG. 163.

the vessel. Although this is the most economical way in building the vessel so that the engine work can be gone on with, yet it is necessary to build a vessel this way where there are no overhead cranes so that the road will be clear for

pieces being put together. Fig. 159 shows the work further completed and a tunnel built on the tank top. These conduits are as a rule laid out in the shop prior to erecting same on vessel.

The conduit work is put upon the tank

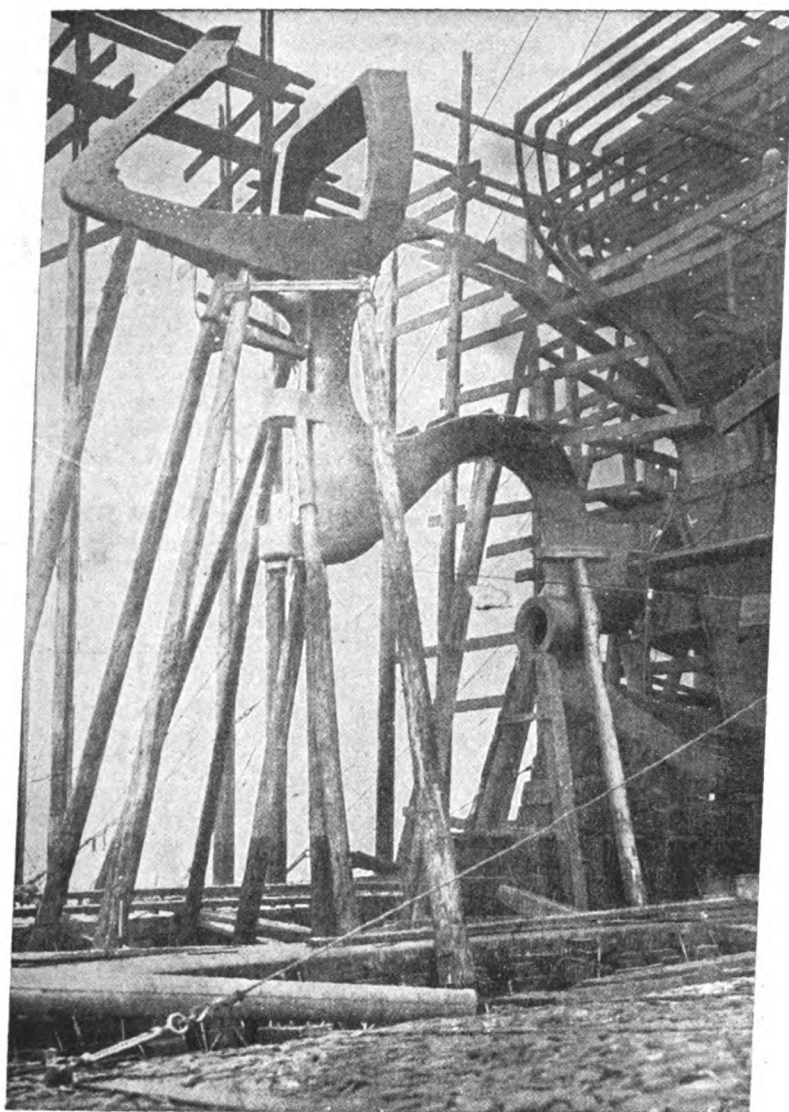


FIG. 164.

top and erected with gin poles as shown by Fig. 159.

Fig. 160 shows the erecting of the side framing, which is composed of channels nine inches deep amidships, and angles and reverse bars at the ends. The frame spacing is 32 in. amidships and 27 in. at the ends. The belt frames are spaced six frame spaces apart beyond and five frame spaces in the boiler and machinery spaces.

Belt frames are 30 in. deep and $\frac{1}{2}$ in. thick, with frames double to shell and heavy face bars continued from tank top to main deck. The bottom framing is composed of floor plate and angle; the angle is joggled over the shell plating in-way of the inside strakes in the double bottom. The beams are erected along with the frames, as shown by Figs. 160, 161 and 162.

Fig. 161 shows the engine room with framing up abaft same. The poles at each side are for hoisting the frames and beams to place. Fig. 162 shows the framing and deck beams amidships. Fig. 163 shows the bow framing and Fig. 164 the

stern framing. These frames at both ends are bunched together until the stem and stern post are fixed in their places. Fig. 165 shows the upper decks

and openings over the machinery space. Fig. 166 shows the bridge and shelter deck construction forward.

Fig. 167 shows the machinery compartment during construction. The forest of shores will be noticed inside of the vessel during construction and how much could be saved by having the material all made from the mold loft.

Fig. 168 shows the boiler room with the seatings completed for the boilers, as well as the great number of shores supporting the decks.

The shell plating runs an inch thick and has an average width of five feet amidships; it is lap-buttet and almost entirely quadruple riveted.

The four top side strakes of the plating of the hull are double strapped and quadruple riveted.

Within the range of the double bottom the shell is also double-strapped, treble riveted inside, and double riveted outside, and the butts of the keel plates are treble riveted.

Wherever possible hydraulic riveting was resorted to, and even before the rivets were put in the plates and angles were forced and held together by hydraulic power, so that the temporary bolts and nuts would bring the surfaces as closely together as possible before riveting. In this way there was absolutely no possibility of yielding when the rivets were put in. The work done by hydraulic power includes the center girder, keel-plate garboard strake, the center strake of the inner bottom, the intercostal girders, the end frames to the reverse angles of beam-knee brackets, the bridge-deckshear strake, the shelter-deck stringer angles, and the side stringers between

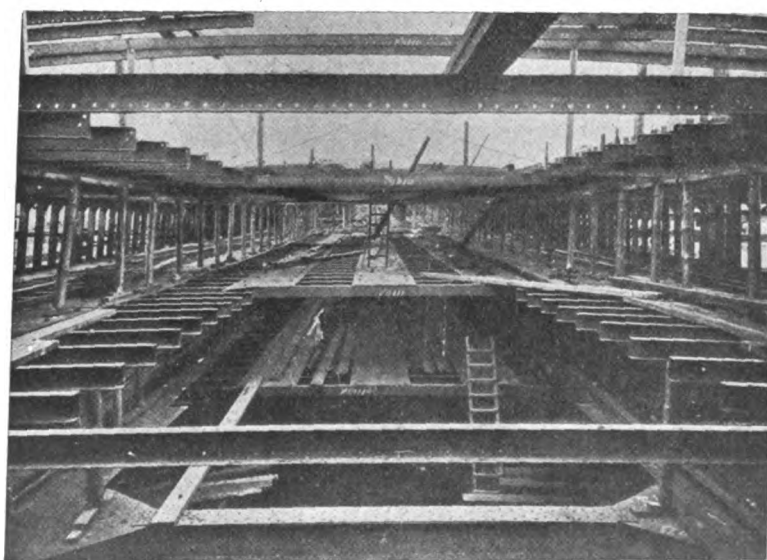


FIG. 165.

the web-frames. The rivets in the shell and tank top plating vary from $\frac{3}{4}$ in. to $1\frac{1}{8}$ in. in diameter, spaced on an average four to five diameters apart. In the

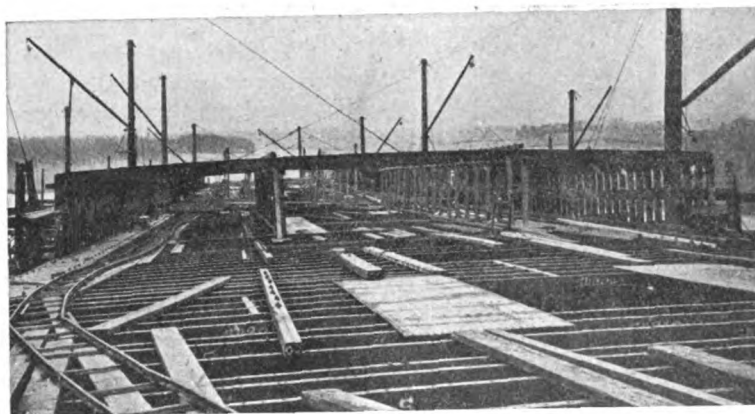


FIG. 166.

bulkheads the sizes generally are $\frac{3}{4}$ in. in diameter, spaced four to five diameters apart; the deck rivets are $\frac{3}{4}$ in., spaced generally four to five diameters apart. The riveting machine was, as is shown in several illustrations, carried on a beam, having on its other end a counterbalancing weight. This beam was supported in the center upon a lattice-built column running on wheels, or on a small truck running on a railway track which was laid on each successive deck as soon as there were beams to carry it.

The following ten sketches will give an idea of time taken in building the largest vessel in the world described by *The Engineer* last year.

The Cunard express steamer *Mauretania* is in length over all 785 feet, length between perpendiculars 760 feet, breadth, extreme 88 feet, depth molded 60 ft. 6 in. Gross tonnage 33,200 tons, net tonnage 11,900 tons, maximum draught 37 feet, displacement at maximum draught 43,000 tons.

Fig. 169 shows midship portion of structural cellular bottom of vessel done in November, 1904. The whole of this part of the structure, including the bot-

tom shell plating, is riveted by hydraulic pressure, and from this view, as well as

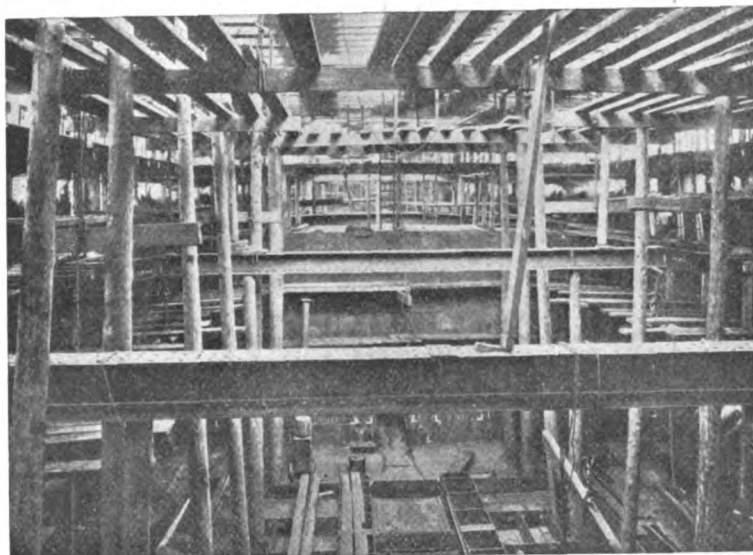


FIG. 167.

several of the others, a good idea may be gathered of the method of carrying out the work, and the heavy tools employed in doing it.

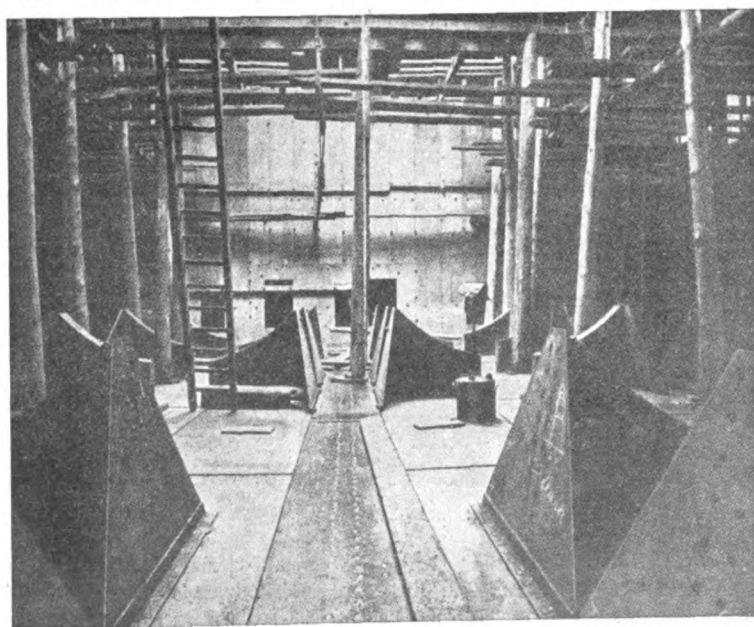


FIG. 168.

The floors with bars attached, having been riveted together, are brought into position by means of the five electric overhead cranes with which the covered in berth is equipped and are riveted to the center keelson by means of large gap hydraulic riveters, these having gaps up to 6 feet. These machines are carried by light swinging jib cranes fastened to the columns of the covered berth. These swinging cranes are portable, and can be easily transported by the electric overhead cranes and fixed anywhere required. The overhead cranes are, of course, much in demand for transporting and erecting the heavier items in the structure.

Fig. 170 shows work done in February, 1905, which includes the double bot-

tom side framing and portions of stem bar in position.

Fig. 171 shows the work done in April, 1905, and is a view from the after end, showing the forward portion of the framing erected, and the inner bottom partly plated.

The double bottom, as will be seen, extends well up the round of the bilge for the sake of increased strength and increased safety. As may also be seen, from this and the other views, the framing consists of channel bars and deep web frames closely spaced. This feature is even better brought out in Fig. 172 which also illustrates clearly the mode of suspending the hydraulic riveting tools already referred to. The framing in this view, as will be seen, has been completed to the stem and the transverse and longitudinal bulkheads are erected to level of lower deck.

Fig. 173 shows a view from aft with frames and beams in position up to engine room. This view gives a good idea of the overhead electric and side swinging jib cranes and clearly shows the channel frames and web frames, also the

deck beams in the position as far as the machinery bulkhead. The great height of the covered-in berth standards, and the runners with electric overhead cranes somewhat dwarf the height of this great vessel itself.

Fig. 174 shows a vitally important part of the huge liner, and at a highly interesting stage of the work of construction. This is a view from aft, and exhibits the frames as they approach the stern post, and the bossing necessary for the outside propeller shafts, also the sweep up of the "deadwood" to meet the fore end of the stern post casting.

Fig. 175 shows the stern framing on Jan. 15, 1906. Fig. 176 is a bow view on May 5, 1906. Fig. 177 shows the bow near completion on Sept. 6, 1906, and Fig. 178 shows the stern on same date two weeks before launching.

This vessel was launched on Sept. 20, 1906, but is not yet in commission. She

for seven years, when he came to this city and engaged in the ship building

with E. Tisdale which lasted for nineteen years. He retired from business in 1869.

The firm of Johnson & Tisdale gained considerable renown by sending the schooners Swallow and Julia Palmer, which they built, from this city to Lake Superior. There were no locks at the Soo then, and the two ships were taken above the rapids overland. This feat was accomplished by the use of greased skids. The firm built many steamboats for the English coast trade.

The contract for carrying the United States mails between Ludington and Milwaukee for the next four years has been awarded to the Pere Marquette line steamers, owned and operated by the Michigan Salt Transportation Co.

C. C. Hand, manager of the Hanna docks at Sandusky, reports that all steamers will be able to reach the docks without trouble the coming season. He reports a depth of 22 ft.

was built at the ship yard of Swan, Hunter & Wigham, Richardson Ltd., Wallsend, England. A sister ship of the Mauretania, the Lusitania, was launched from the Clydebank ship yard, Glasgow, Scotland, on June 7, 1906.

OBITUARY.

Capt. Harlow R. Arey, surveyor for the Mannheim and the Fireman's Fund insurance companies, died recently at New Orleans.

Seth W. Johnson, one of Cleveland's early settlers and a pioneer ship builder and ship owner died last week at his home in Lakewood, aged 65 years. Mr. Johnson helped to complete two of the first steamboats built in Cleveland, the Constellation and the Robert Fulton. Mr. Johnson was born at Middle Haddam, Conn., in May, 1811, and lived on his father's farm until fourteen years old. He served an apprenticeship at the ship building trade

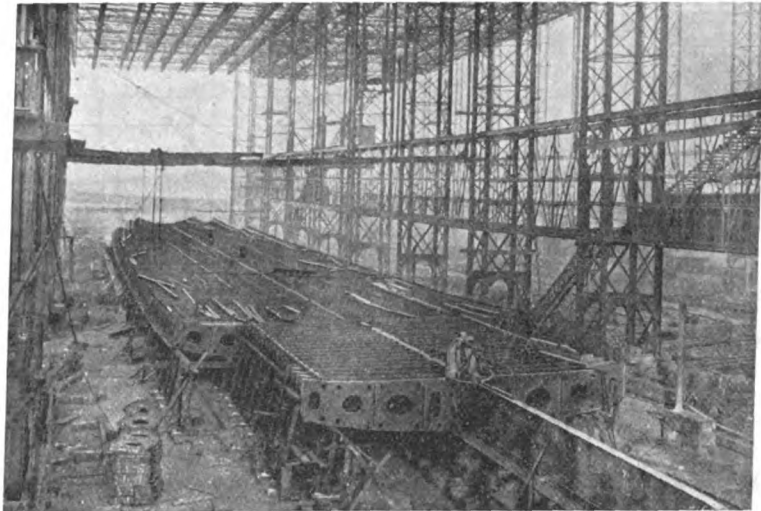


FIG. 169.

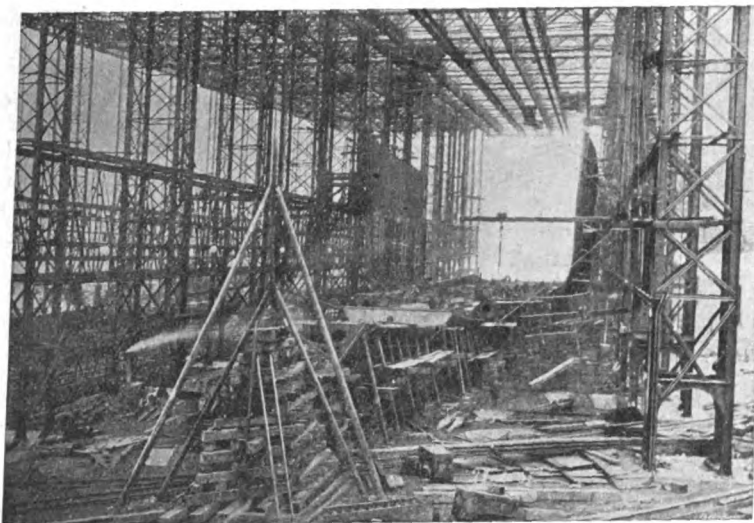


FIG. 170.

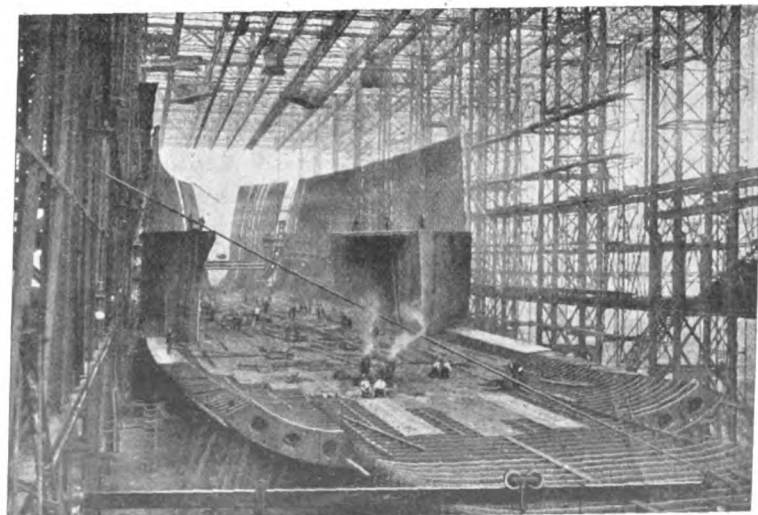


FIG. 171.

SCIENTIFIC LAKE NAVIGATION

By Clarence E. Long

HOW TO FORM A TABLE OF DEVIATION.

CHAPTER VII.

WHAT CONCERNS HIM MOST.

The finding of the compass deviation and its tabulations are probably of more real and practical benefit to the lake mariner than any other one branch of lake navigation. How to ascertain, name and apply the compass deviation concerns him far more than its causes and effects.

THE VARIOUS METHODS.

There are several methods in use for ascertaining and tabulating the deviation. These methods are known by the following names. "By the known correct magnetic bearing of a range (such as two lighthouses, a lighthouse, church or chimney, or other object, in line); "By the known correct magnetic bearing of a distant object;" "By reciprocal simultaneous bearings;" "By amplitudes of the sun," and "By time azimuths of the sun, moon and stars."

TIME AZIMUTHS.

The method of time azimuths is of genuine benefit and is especially adapted for use on the great lakes. It is a handy and convenient method, and one that answers every purpose, no matter where you are, inside or outside of port, or out of sight of land. By its method the deviation can be ascertained and tabulated and a vessel put on the right course. You cannot do this with any of the other methods. In fact the method of time azimuths can be employed where the compass is of no use at all.

GOING IN AND COMING OUT OF PIERS.

The azimuth method is a simple one, and a knowledge of it is easily acquired, and is more easily learned than many may believe.

Where a knowledge of time azimuths is once acquired all other methods will be discarded for it, and hardly, if ever, thought of let alone used, unless, with the possible exception of noting and verifying the deviation on river and harbor pier ranges, etc., which for this purpose alone, are of the greatest possible convenience to the lake navigator.

THE SIMPLEST METHOD.

First, we will explain the simplest method of finding and forming the deviation; second, the method or methods employed being especially adapted for the need of the lake navigator; third, that a practical knowledge of compass deviations is easily acquired by any master or pilot on lake vessels, and that the finding and tabulation of the deviation, as well as its application in deducing one kind of course or bearing to another kind of course or bearing, is much

more simple than it at first looks, and much more easily learned than many have been led to believe.

We will first explain how to find and name the deviation going out and coming into piers (being parallel thereto) and when on with a range, ahead or astern. This is the first step to take, and it will lead the student gently and gradually to the azimuth method, which is the cream of them all, and by far the best, quickest and safest method known for ascertaining the deviation, the true course or bearing, the correct magnetic course or bearing, etc., all of which will be fully explained in its right place.

TO GET THE NECESSARY INFORMATION.

The arguments necessary to the solution of the pier range problem, are the true bearings, the variation at place of ship, and the compass bearing, that is, the bearing as shown by the compass on board. The first thing to be done in this work is to find the true bearing of the piers to be used; this can be taken off the chart (from the true compass diagram) or from the government lighthouse book, which gives all bearings, etc., as being true, while all those taken from the Canadian book are correct for variation, and represent correct magnetic bearings. To get the true bearings of piers it is much easier and more accurate to take them from the lighthouse book than to measure them from the chart, especially a small scale chart. To the true bearing apply the variation at place; if Ely. to the left of the true bearing to get the correct magnetic bearing; and if Var. is Wly. to the right of true bearing to get the correct magnetic bearing; then the difference between the correct magnetic bearing, or what we know it to be, and the bearing as shown by compass (called compass course or bearing, in this case it is course) is the Dev. and is named Ely. if the correct magnetic bearing is to the right of the compass bearing; and if the correct magnetic bearing is to the left of the compass bearing then it is named Wly. Dev. This has been so thoroughly explained in a former chapter, that it hardly seems necessary to say more on the subject, but whenever and wherever we deem it necessary we will sandwich in more explanations.

NOTE.—If the Var. was not applied to the true bearing and the compass bearing compared with it the difference would be the Var. and Dev. combined. This would not do because the Var. is different at different places, being Ely. in some places and Wly. in others. By applying the Var. to the true course or bearing it is just the same as getting rid of the

Var., so that it cannot get into the Dev. Remember this. As we have already learned, applying the Dev. to the correct magnetic bearing gives the corresponding compass bearing, therefore the difference between the correct magnetic bearing and the compass bearing must be the deviation. Where there is no deviation the compass bearing will also be the correct magnetic bearing and vice versa.

HOW TO FIND THE DEV. BY PIER RANGES.

Now, we will take an example just as it comes up in every-day practice:

Example:—How had your compass ought to read if it were right coming out parallel with the piers at Milwaukee? But supposing that your compass read ENE $\frac{3}{4}$ E; how much is the deviation and which way is it, i. e., its name Ely. or Wly.?

By looking in the lighthouse book we find that the true bearing of these piers is east, and the Var. for Milwaukee on the chart says 3° 04' Ely. So, here is the way it would be put on paper:

True bearing of piers—E = 8 pts. r. of n.
Var. 3° 04' Ely (to the left) = $\frac{1}{2}$ pts. l.

Corr. Mag. bearing of piers $7\frac{3}{4}$ " r. of n.
Com. bearing ENE $\frac{3}{4}$ E (—) $6\frac{3}{4}$ " r. of n.

Dev. on E $\frac{1}{4}$ N (corr. mag.) 1 " r., Ely.

The deviation on correct magnetic E $\frac{1}{4}$ N is 1 point Ely., because the corr. mag. bearing [E $\frac{1}{4}$ N] is to the right of the compass bearing [ENE $\frac{3}{4}$ E], consequently the Dev. is named Ely. Here is another proof: Dev. Ely. is allowed to the left of the correct magnetic course to get the compass course; hence if you move to the left of E $\frac{1}{4}$ N (c. m. b.) 1 point (the amount of the dev.) it brings you to ENE $\frac{3}{4}$ E (the compass bearing). Or, again, to find the c. m. c., the compass course and dev. given, allow easterly deviation to the right; hence 1 point to the right of compass bearing ENE $\frac{3}{4}$ E, is E $\frac{1}{4}$ N, the c. m. b. Do you see? Just try this on the portable compass card. Let E $\frac{1}{4}$ N on outer card represent the c. m. bearing of piers, then swing the inner card (which is to represent the compass on board) so that ENE $\frac{3}{4}$ E comes or coincides with E $\frac{1}{4}$ N on the outside or fixed card. Does not the inside card representing the compass board have to swing to the right for ENE $\frac{3}{4}$ E to come where E $\frac{1}{4}$ N is? This is just the manner in which the compass card moves on board ship; you cannot see it move, but it does just the same, for we know that where ENE $\frac{3}{4}$ E is E $\frac{1}{4}$ N should be. If there were no deviation on E $\frac{1}{4}$ N, then in going out of the piers your compass would read precisely the

same as what you know the c. m. b. to be; in this case, $E\frac{1}{4}N$.

Bear in mind that the Dev. just found is good only for that one course, and as soon as the vessel's head is changed to another course the deviation will be different in amount and probably different in name.

We will now go on and show in a simple and practical way how a full table of deviation for an entire swing of the compass can be determined from the eight principal points of the compass right in the harbor of Milwaukee.

After getting clear and outside of the piers turn your boat around and head in for the center of the piers, and be careful to be in line with them. Now, if your compass is correct it will read $W\frac{1}{4}S$, the reverse of $E\frac{1}{4}N$, or the true bearing is W and the Var. $\frac{1}{2}$ -pt. Ely, allowed to the left gives us $W\frac{1}{4}S$. But supposing that when you get your boat lined up with the pier the compass says W by N; how much is the Dev. and which way is the compass card drawn? (It is the direction of the swing of the card that gives us the name of the deviation).

Corr. Mag. bearing $W\frac{1}{4}S=7\frac{3}{4}$ pts. r. of s.
Comp. bear'g $WxN (+)=7$ pts. l. of n.

$14\frac{3}{4}$
16

Deviation $1\frac{1}{4}$ pts. Wly.

Because the c. m. bearing ($W\frac{1}{4}S$) is to the left of the compass bearing (W by N), the difference between the two being $1\frac{1}{4}$ points. Try this and prove it on the portable card.

The southerly end of the Milwaukee breakwater runs true N by E and S by W (see lighthouse book) Var. the same as before ($\frac{1}{4}$ -pt. Ely). Either head on and in line with the breakwater, or lay alongside of it, and parallel thereto (the stem and stern timbers the same distance from the outside facing of the breakwater). If your compass is correct how had it ought to read both ways on the breakwater?

True bearing $NxE=1$ pt. r. of n.
Var. $3^{\circ} 04'$ Ely. $=\frac{1}{4}$ pt. l.

Corr. Mag. bearing $\frac{3}{4}$ pt. r. of n., or $N\frac{3}{4}E$.

The reverse of $N\frac{3}{4}E$ is $S\frac{3}{4}W$, the two correct magnetic directions the compass ought to read if correct. But supposing that when you head on it to the north that your compass reads $N\frac{1}{2}E$, and to the south'ard S by W. How much is the Dev. in each case and which way is it?

Corr. Mag. bearing $N\frac{3}{4}E=\frac{3}{4}$ pt. r. of n.
Compass bearing $N\frac{1}{2}E=\frac{1}{2}$ pt. r. of n.

Deviation $\frac{1}{4}$ pt. Ely.
Corr. Mag. bearing $S\frac{3}{4}W=\frac{3}{4}$ pt. r. of s.

Compass bearing S by W $=1$ pt. r. of s.

Deviation $\frac{1}{4}$ pt. Wly.

Thus, the Dev. on c. m. $N\frac{3}{4}E$ is $\frac{1}{4}$ pt. Ely.; and the Dev. on c. m. $S\frac{3}{4}W$ is $\frac{1}{4}$ pt. Wly.

Remember that the Dev. is always the difference between the c. m. bearing and the comp. bearing.

The lighthouse on the end of the breakwater ranges with the one on the end of the north pier true $NE\frac{1}{4}E$ and $SW\frac{1}{4}W$ (see lighthouse book for this information), what are the correct magnetic bearings of this range both ways?

True bearing $NE\frac{1}{4}E=4\frac{1}{2}$ pts. r. of n.
Var. $3^{\circ} 4'$ Ely. $=\frac{1}{4}$ pts. l.

Corr. Mag. bearing 4 pts. r. of n.; or NE.

The reverse of this is SW. Supposing that you were coming in from outside and you had these two lighthouses in range (say when you were inside of North Pt.); when steady and directly on the range your compass says $SW\frac{1}{2}W$; how much is the Dev. and which way is it?

Corr. Mag. bearing $SW=4$ pts. r. of s.
Comp. bear. $SW\frac{1}{2}W=4\frac{1}{2}$ pts. r. of s.

Deviation $\frac{1}{2}$ pt. Wly.

Now turn your boat around and head out getting these two lighthouses directly over the stern (line up with the spars, or smokestack) and when you are steady on it your compass says $NE\frac{3}{4}N$; how much is the deviation and which way is it?

Corr. Mag. bearing $NE=4$ pts. r. of n.
Comp. bearing $NE\frac{3}{4}N=3\frac{3}{4}$ pts. r. of n.

Deviation $\frac{3}{4}$ pts. Ely.

NOTE.—Be sure to keep a memorandum of the deviations for the points already found; and bear in mind that it is only good for those points on which it was found.

The black can buoy off Milwaukee South Pt. and the Milwaukee pierhead lighthouse ranges true $NW\frac{1}{8}N$, and $SE\frac{1}{8}S$, Var. $3^{\circ} 4'$ Ely, what are the corresponding correct magnetic courses?

True bearing $NW\frac{1}{8}N=3\frac{7}{8}$ pts. l. of n.
Var. $3^{\circ} 4'$ Ely. $=\frac{1}{4}$ pt. l.

Corr. Mag. bearing $4\frac{1}{8}$ pts. l. of n., or $NW\frac{1}{8}W$.

The reverse of this is $SE\frac{1}{8}E$. The foregoing correct magnetic bearings would be the readings of the compass on this range both ways if it were right.

Supposing that in the one case it read $NW\frac{5}{8}N$, and in the other case $SE\frac{5}{8}E$; how much and which way is the Dev. in both cases?

NOTE.—In cases like the above place your boat directly between the two objects, and about midway between them.
Corr. Mag. bearing $NW\frac{1}{8}W=4\frac{1}{8}$ pts. l. of n.

Compass bearing $NW\frac{5}{8}N=3\frac{3}{8}$ pts. l. of n.

Deviation $\frac{3}{4}$ pt.

Wly.

Corr. Mag. b. of range $SE\frac{1}{8}E=4\frac{1}{8}$ pts. l. of s.

Compass b. of range $SE\frac{5}{8}E=4\frac{5}{8}$ pts. l. of s.

Deviation $\frac{1}{2}$ pts.

Ely.

Thus, we have the Dev. for the 8 principal points of the compass, or near enough to these points so that we can determine the Dev. on them. Remember that in each case the Dev. is for the correct magnetic points of the compass, and not for the compass points or true points, but the correct magnetic points; that is, when the vessel heads $SE\frac{5}{8}E$, as in the above case she is really heading correct magnetic $SE\frac{1}{8}E$, but the compass needle carrying the card is drawn to the right hand or Ely of the magnetic meridian by the attraction of the ship's iron, which is the cause of the deviation.

Now, to find from these deviations the Dev. corresponding to the remaining intermediate points of the compass:

NOTE.—When the deviations are not large (as in the foregoing examples) and increase and decrease regularly, as they do above, and are taken for about equidistant points, we can calculate the deviation between these points by taking the mean of the deviations on two given points to find it on the point lying midway between them. This process is not precisely accurate only under the above-named conditions, and that is, that the deviation is small and regular; but in a good many cases will be sufficiently correct to answer in practice. However, we give it here more to show what can be done with the limited means at hand, as found on some vessels for finding this compass correction; and also to lead the student step by step to more important and necessary steps in the observations for compass deviations. In practice these luke-warm conditions are not frequently met with, hence the necessity of other and more accurate methods.

When the deviations are large and increase and decrease irregularly, they are arrived at by a different method and process.

Now, to go on with finding the deviations of intermediate points. The first thing to be done is to rule and make a blank form like the following:

DEVIATION TABLE BLANK.

For.....	Ship's Head Correct Mag.	Deviation in Points.	Ship's Head Correct Mag.	Compass Deviation in Points.
North	South
N by E	S by W
NNE	SSW
NE by N	SW by S
NE	SW
ENE by E	WSW by W
ENE	WSW
E by N	W by S
East	West

E by S	W by N
ESE	WNW
SE by E	NW by W
SE	NW
SE by S	NW by N
SSE	NNW
S by E	N by W

Now, from the memorandum of the deviations already found, write in column 2 the deviation corresponding to each of the correct magnetic points on which it was found. When the Dev., as in the above case could not be found exactly on the even point, take the nearest even point to it. The form as given below will explain this; also your work should stand as it does in this table:

DEVIATION TABLE BLANK.

For	Ship's Head Correct Mag.	Deviation in Points	Ship's Head Correct Mag.	Deviation in Points
North			South	
N by E	1/4 Ely.		S by W	1/4 Wly.
NNE			SSW	
NE by N	1/2 Ely.		SW by S	1/2 Wly.
NE	1/2 Ely.		SW	1/2 Wly.
NE by E	3/4 Ely.		SW by W	3/4 Wly.
ENE			WSW	
E by N	1/4 Ely.		W by S	1/4 Wly.
East	1/2 Ely.		West	1/2 Wly.
E by S	1/2 Ely.		W by N	1/2 Wly.
ESE			WNW	
SE by E	3/4 Ely.		NW by W	3/4 Wly.
SE	1/2 Ely.		NW	1/2 Wly.
SE by S	1/4 Ely.		NW by N	1/4 Wly.
SSE			NNW	
S by E	1/4 Ely.		N by W	1/4 Wly.
Neutral Line	0		Neutral Line	0
South	1/2 Wly.		North	1/2 Ely.

Then proceed as follows: To get the Dev. for ESE c. m., for instance, add together the deviations for E and SE (if they are of the same name) and divide by 2 (the mean), thus the Dev. on E is 1-pt. Ely., and on SE 1/2-pt. Ely., therefore; $1 + \frac{1}{2} \div 2 = \frac{3}{4}$ -pt., then 3/4-pt. is the Dev. corresponding to ESE, which is the middle point between E and SE; then to get the Dev. for E by S (midway between E and ESE) add the two deviations corresponding to these points and divide by 2 and you have it; $1 + \frac{3}{4} \div 2 = \frac{7}{8}$. Between N by E and NW by way of north the Dev. changes name, so here subtract the less from the greater, giving it the name of the greater, and divide by 2 gives the Dev. for the point lying half way between these two points taken, thus:

Dev. on N by E = 1/4-pt. Ely.

Dev. on NW = 3/4-pt. Wly.

Difference $2) \frac{1}{2}$ (1/4-pt. Wly. Dev. corresponding to N by W 1/2 W.

Then the Dev. half way between N by W 1/2 W and NW will be the mean of these two deviations, etc. The Dev. between N by E and N by W 1/2 W, 1/4-pt. Ely. and 1/4-pt. Wly., counteract each other so that the line of no deviation comes on the point N 1/4 W, and so it does. When you have completed the form it should be as this one:

DEVIATION TABLE BLANK.

For	Ship's Head Correct Mag.	Deviation in Points	Ship's Head Correct Mag.	Deviation in Points
North			South	
N by E	1/4 Ely.		S by W	1/4 Wly.
NNE			SSW	
NE by N	1/2 Ely.		SW by S	1/2 Wly.
NE	1/2 Ely.		SW	1/2 Wly.
NE by E	3/4 Ely.		SW by W	3/4 Wly.
ENE			WSW	
E by N	1/4 Ely.		W by S	1/4 Wly.
East	1/2 Ely.		West	1/2 Wly.
E by S	1/2 Ely.		W by N	1/2 Wly.
ESE			WNW	
SE by E	3/4 Ely.		NW by W	3/4 Wly.
SE	1/2 Ely.		NW	1/2 Wly.
SE by S	1/4 Ely.		NW by N	1/4 Wly.
SSE			NNW	
S by E	1/4 Ely.		N by W	1/4 Wly.
Neutral Line	0		Neutral Line	0
South	1/2 Wly.		North	1/2 Ely.

A SIMPLE PROBLEM.

Query.—Will you kindly explain fully how to work the following example: "Two steamers 3 miles apart are approaching each other from reverse directions (head and head, or nearly so;) one steamer is making 10 miles an hour and the other 8 miles an hour, how long will it take them to reach or come up with each other?" Is the answer 10 1/8 minutes? This is the answer given by those who claim to know how to work it. This example has given rise to considerable argument among steamboat men in general, and especially those going for the examinations for license, as it is, I understand, a question given the candidate by the inspection board. All manner of solutions have been given the problem, and as nearly everyone who has worked it seems to think his particular method is correct, I decided to write you for an explanation in order that we may be set right. Why do the inspectors give such questions as these? I can't see where such an example could be practically applied. I know fellows that have been studying on this problem and similar ones nearly all winter. I don't see what particular good it does them to bother their heads in this way, even if they do get it, where if they would devote the same amount of time and study on variation and deviation, etc., they would be realizing some practical benefits from their efforts. Thanking you for your good work and assuring you that your explanation will be much appreciated, I am

Yours truly,

A CAREFUL READER OF THE MARINE REVIEW.

Buffalo, N. Y., Feb., 1907.

Answer.—Explanation.—The vessel that steams 10 miles an hour requires 6 minutes to make 1 mile, and the one going 8 miles an hour requires 7 1/2 minutes to cover a mile. When the steamer making 8 miles has run 7 1/2 mins. the steamer making 10 miles has run a mile and 1 1/2 mins. on the

next mile. The next question then is: what part of a mile does the ship making 10 miles make in 1 min.? She makes 1-6th of a mile, because it takes her 6 mins. to make a mile. If she makes 1-6th of a mile in 1 min., in 1 1/2 mins. she will go 1-6 x 1 1/2, or thus; 1-6 x 3-2 equals 3-12 mile, and 3-12ths of a mile reduced is 1/4th mile. In other words while the ship making 8 miles an hour made 1 mile (time 7 1/2 mins.), the ship making 10 miles an hour ran 1 1/4 miles, or the speed of the two steamers together in the 7 1/2 mins. is 2 1/4 miles. Therefore, if in 7 1/2 mins. they make 2 1/4 miles how long will it take them to run 1 mile? It will take them as many minutes as 2 1/4 is contained times in 7 1/2 mins., or thus: 7 1/2 divided by 2 1/4, which would be 15-2 x 4-9 equals 60-18, or 3 6-18, which equals 3 1-3 minutes to make a mile. Hence, if it takes 3 1-3 minutes to make 1 mile for 3 miles it will take 3 times 3 1-3 minutes or 10 minutes. The answer as you see is 10 minutes.

Here is a more simple way of working such examples: Add the speeds of the two vessels together and consider it as one vessel making this speed. This makes its solution very simple. Take the foregoing example for instance. The speed of the two steamers together equals 18 miles per hour, or what is the same thing as a ship making a speed of 18 miles an hour. If a ship makes 18 miles an hour how long does it take her to run 1 mile. At 18 miles an hour it will take 3 1-3 minutes to cover a mile, and to cover a distance of 3 miles it will take 3 times 3 1-3 minutes, or 10 minutes. If two steamers are approaching each other from reverse directions they must be approaching each other at a speed equal to their combined speeds, and that is all there is to it. While the problem is a simple one when you know "how," it is not so simple when you are first given it. I gave this example to the instructor in arithmetic of the local high school and she had her class "guessing" for a number of days. The majority of them worked it by averaging the speeds, the same as you have probably worked it for they got the same answer as you sent in. Thus: the mean of 6 and 7 1/2 is 6 3/4, the time it takes them to make 2 miles, or the average speed for 1 mile is 3 3/8 minutes, and for 3 miles 3 times 3 3/8 equals 10 5/8 minutes. This is incorrect.

No, the example has no practical application. Mariners would be better off if they studied the solution of problems that engaged their everyday practice. The government inspec-

tion boards would be taking a step forward if they would cut out a lot of their buga-boo questions which have no bearing on the safety methods of taking a ship from one port to another. Such questions as the above example give the young man who is trying to get to the front rank of the profession an altogether wrong impression of what is required of a real lake navigator. If these are the kind of questions the steamboat inspection service persists in giving candidates that come before them then just so long will our men waste their time in studying them. It seems a shame that with the wonderful growth and advancement of the lake marine in the past few years that the steamboat inspection service has made so little progress along the line of examining candidates. We hear so much about our wonderful government but when individuals have got to step in and play the part that the government should play it is not right. The government should take the lead in these matters and not wait for individuals to first clear the way. What are our representative men for, and what do they get paid for? There is a heap more that might be said on this subject, but this will suffice for the present.

LONG.

A FEW CORRECTIONS.

That portion of the Navigation Lessons on the Deviation of the Compass which appeared on page 28 of Jan. 10 issue in regard to the rules of naming the deviation, was not printed according to the way it was written. The rules for naming the deviation, that is, to tell whether it is Easterly or Westerly are simply these: "When the correct magnetic course or bearing is on the *right* hand of the course or bearing shown by compass (or simply the compass course or bearing) the deviation is named Easterly." "When the correct magnetic course or bearing is to be left of the compass course or bearing the deviation is named Westerly." This is all there is to it. With Ely. Dev. the correct magnetic points corresponding to the same points by compass are to the left of those shown on the compass. For this very reason Ely. Dev. is allowed to the *left* of the correct magnetic course we wish to make good in order to find that point on the compass that will correspond to it. With Wly. Dev. the correct magnetic points corresponding to the same points by compass will be found on the right hand of the same point as shown by compass. For this reason if we desire to make good any correct magnetic course we allow the amount of our deviation to the right of what the correct magnetic course is. For example: The Dev.

is one point Ely. Suppose NE is the correct magnetic course, then the point on the compass corresponding to correct magnetic NE is one point to the left of NE, as shown by compass, or NE by N on the compass coincides with NE correct magnetic. With Wly. Dev. it would be just the reverse. Always bear the rules in mind and you will make no mistake. Remember that in turning a true course to a compass course that Ely. Var. and Dev. are always allowed to the left, and Wly. Var. and Dev. to the right. But when turning a compass course into a true course Ely. Var. and Dev. are allowed to the right and Wly. to the left. Remember that Ely. Var. and Dev. means a pull of the card to the right so that if no allowance is made for either the Var. or Dev. the ship in steering the course by compass will follow the card. If Ely. carries to the right so will the ship be carried to the right, and if Wly. carries to the left so will the ship carry to the left if no allowance is made for either Wly. Var. or Dev. If we simply steer the course by compass without making any corrections the ship, according to the true direction is going to carry either to the right or to the left of the true course having the same name as the course steered on by compass. It is for this reason that after we have steered a course by compass without making any allowances that if we desire to find the true course the ship has been going in that we allow Ely. Var. and Dev. to the right of the compass course steered to find the true course, and to the left of the compass course for Wly. Var. and Dev.

LONG.

QUESTIONS FOR MASTERS AND MATES.—NO. 30.

445. Three observations for the deviation on the same point of the compass give the following deviations: 8° ; $8\frac{3}{4}^\circ$ and $8\frac{1}{2}^\circ$, what is the mean deviation?

446. A steamer making 11 statute miles an hour will take how long to complete a run of $98\frac{1}{2}$ statute miles. How long, should it take a steamer making $11\frac{1}{2}$ knots to complete the distance of $98\frac{1}{2}$ statute miles?

447. A steamer making $10\frac{3}{4}$ statute miles per hour is $5\frac{1}{2}$ nautical miles ahead of another steamer advancing in the same direction which makes 12 knots. How long should it take the steamer making 12 knots to overhaul the steamer making $10\frac{3}{4}$ statute miles and that is $5\frac{1}{2}$ nautical miles in advance?

448. A sailing vessel sails due north for 30 miles and due east for 30 miles; a steamer starting from the same place the ship desires to steer direct to the point the ship has arrived at what must the steamer steer and

what distance must she run to do it?

449. It takes your boat 4 hours 23 minutes to make $47\frac{1}{2}$ miles, how fast is she going per hour?

450. If a steamer started from Lat. $43^\circ 20' N.$ and sailed due north 70 nautical miles what latitude has she arrived in?

451. A vessel from Lat. $44^\circ 14' N.$ sails due south until she arrives in Lat. $43^\circ 12'$, how many nautical miles has she sailed?

452. A boat steaming at the rate of 11 knots steams how many knots in 7 hours 30 minutes? How long will it take a boat that makes 11 statute miles per hour to cover the same distance?

453. Two steamers are approaching each other on reverse courses or nearly so, one steams 13 miles per hour and the other 9 miles. They are $3\frac{1}{2}$ miles apart how long will it take for them to meet?

454. A vessel sails due east from Long. $88^\circ W$ on the parallel of 60° north until her longitude is $86^\circ W$, how many nautical miles has she covered?

455. What is the principle of the 4-point bearing?

456. If a steamer makes 14 knots how many yards does she cover per minute?

457. What is the difference in the sun's time between Buffalo and Cleveland? What is the difference in standard time between these ports?

458. What is true noon? What is mean noon?

459. What is the difference between true noon and mean noon?

QUESTIONS FOR WHEELSMEN AND WATCHMEN.—NO. 31.

315. A boat travels a mile in 5 min. 20 sec. Find rate of speed per hour?

316. A boat travels a mile in 3 min. 52 sec. Find rate of speed per hour?

317. If a boat travels a mile in 11 min. 36 sec., how far will it go in $1\frac{1}{2}$ hours?

318. A boat travels a mile in 8 min. Find rate of speed per hour.

319. A boat travels a mile every 5 min. 27 sec. how far will it go in an hour?

320. A boat travels a mile in 6 min. 19 sec. Find rate of speed per hour.

321. A boat makes 16 miles per hour. What is the time per mile?

322. A boat makes $12\frac{1}{2}$ miles per hour. What is the time per mile?

323. A boat makes $11\frac{1}{2}$ miles an hour. What is the time per mile?

324. A boat makes $10\frac{1}{2}$ miles an hour. What is the time per mile?

325. A boat makes 11 miles an hour. What is the time per mile?

Huge All-Rail Shipment of Lake Superior Ore in 1906 Shown by Official Figures.

The statement showing the shipments from each mine of the Lake Superior region, together with the totals from the various ranges, which *The Iron Trade Review* compiles annually, is here presented for the year ending Dec. 31, 1906. The supplement, showing the shipment record of the mines since the beginning of mining in the Lake Superior district, will be issued next week. The output in gross tons, as indicated, was 38,522,139, of which 1,008,544 tons was hauled by rail, an unprecedented all rail shipment, and 37,513,595 tons by lake. Comparing these figures with those of some previous years, as shown in the table accompanying, an increase for 1906 over 1905 of 4,168,683 tons is indicated, the unexpectedly large all-rail shipment developing a considerably greater shipment than was anticipated. These figures do not include the shipment from the Helen mine in Ontario belonging to the Lake Superior Corporation, which amounted to 121,555 tons.

It will be readily noted that of the tonnage gains made in 1906 over 1905, almost the entire amount came from the Mesabi range, the Marquette and Gogebic ranges, on the contrary, falling behind their production of the previous year. Not only is the output of the Mesabi range wonderful, but even more remarkable is the rapidity with which it has grown, as shown by comparing its output in the last three years. In 1904 the Mesabi mines yielded 12,156,008 tons; in 1905, 20,153,699 tons; and in 1906, 23,792,782 tons. While this fact, as compared with the development of the other ranges, is not otherwise than those who know the characteristics of the range would expect, it is none the less impressive and none the less indicative of a remarkable display of energy on the part of mining companies interested, in taking advantage of the natural ease of mining. Of the total shipment in 1906, the Mesabi ores comprised 61.8 per cent, as compared with 58.66 per cent in 1905;

55.7 per cent in 1904, and 53 per cent in 1903. Of the ore shipped from the Mesabi, approximately 50 per cent was of Bessemer grade. The shipping list was increased by the opening of 13 new mines, namely, the Adriatic, Brunt, Crosby, Hobart, Hull-Rust, Jennings, Larkin, Mayas, Mohawk, St. Paul, Susquehanna, Victoria and Wacoutah. This was responsible for 2,208,661 tons of the shipment increase. The most noteworthy of these new mines is, of course, the Hull-Rust open pit adjoining the Mahoning mine at Hibbing. Attention may be called to the Virginia mine, sometimes called the Oliver or Mesabi Mountain, which now includes the Ohio, Norman and Lone Jack. These properties are being stripped and will form one open pit in the future, all shipments being grouped under the name Virginia. The Tesora mine also, which was opened up this year by Capt. M. L. Fay, and later leased to the New York State Steel Co., experienced the change of name to Larkin. The Aetna mine is now included in Mountain Iron, and the old Cloquet mine is now part of the Spruce. In the accompanying table only those mines which produced in 1906 are listed, though in the supplement all mines producing since 1896 will appear, as usual.

On the Gogebic range there was but one new mine on the shipping list, the Castile, which did not produce sufficient, however, to counterbalance the inability to approach the output of 1905 from the range. Some explanation may be of assistance in regard to the Aurora and Pabst mines, which are now included in the Norrie group. The shipment from the Hennepin mine includes 667 tons taken from the old Pence shaft. The Eureka mine is almost a new shipper, for it has resumed this year for the first time since 1896. The Davis mine of the Steel Corporation, formerly listed as the Wisconsin, is to be known as the Davis in the future. It appears from developments during the past year on the Gogebic

MESABI RANGE.		Production by Mines.	
Mine.	Gross tons.		
1906.		Eureka ...	37,525
Adams	1,238,350	Harmony ...	9,436
Adriatic ...	3,294	Hennepin ...	5,768
Agnew	163,260	Iron Belt ...	3,227
Ajax	9,057	Ironton ...	106,158
Albany	356,371	Mikado ...	154,043
Alexander ...	60,547	Montreal ...	139,202
Bessemer ...	131,791	Newport ...	549,745
Biwabik ...	807,374	Norrie ...	
Brunt	75,401	Group ...	1,244,468
Burt	1,377,066	Ottawa	57,219
Cass	65,961	Palms ...	5,622
Chisholm ...	379,156	Pike ...	17,934
Cincinnati ...	1,373	Sunday ...	
Clark	274,394	Lake ...	86,879
Commodore ...	263,401	Tilden ...	169,697
Corsica ...	100,606	Yale ...	56,657
Crosby ...	115,373	Total	3,641,985
Croxtan ...	162,533	MENOMINEE RANGE.	
Cyprus ...	192,144	Mine.	Gross tons.
Duluth ...	158,336	1906.	
Elba	255,580	Antoine ...	195,855
Fayal ...	1,634,853	Aragon ...	431,000
Forest ...	41,647	Armenia ...	27,882
Franklin ...	66,935	Baltic ...	186,495
Frantz ...	11,068	Breen ...	21,004
Genoa ...	179,468	Bristol ...	298,031
Glen ...	279,424	Caspian ...	80,875
Hawkins ...	294,588	Calumet ...	15,773
Hector ...	37,221	Chapin ...	943,425
Higgins ...		Commonwealth ...	6,346
No. 2....	341,319	Crystal ...	
Hobart ...	975	Falls ...	111,871
Holland ...	95,472	Dunn ...	91,476
Hull ...	282,592	Eleanor ...	3,121
Hull-Rust ...	1,690,311	Florence ...	169,459
Iroquois ...	190,971	Genesee ...	80,971
Jennings ...	84,715	Great ...	
Jordan ...	110,768	Western ...	311,218
Kinney ...	57,691	Hemlock ...	106,437
La Belle ...	50,466	Hiawatha ...	20
Larkin ...	12,031	Hilltop ...	7,820
La Rue ...	175,670	Lamont ...	89,980
Laura ...	138,001	Lincoln ...	5,890
Lectionia ...	308,989	Loretto ...	140,390
Leonard ...	254,368	Michigan ...	146
Lincoln ...	367,192	Millie ...	36,815
Mahoning ...	1,274,232	Munro ...	47,454
Malta ...	115,763	Nanaimo ...	91,792
Mayas ...	107,244	Paint River ...	28,321
Miller ...	234,071	Penn Iron ...	
Minorca ...	155,541	Mining ...	
Mohawk ...	92,715	Co.	496,582
Monroe ...	310,839	Pewabic ...	493,891
Morris ...	1,809,743	Riverton ...	161,704
Morrow ...	64,073	Saginaw ...	21,017
Mtn. Iron ...	2,536,249	Tobin ...	235,867
Myers ...	228,451	Vivian ...	122,577
Pearce ...	66,386	Youngs ...	47,583
Pettit ...	82,757	Total	5,109,088
Pillsbury ...	33,546	MARQUETTE RANGE.	
Rust ...	284,517	Mine.	Gross tons.
Sellers ...	241,031	1906.	
Shenango ...	383,717	American ...	419
Sparta ...	235	Bessie ...	1,646
Spruce ...	674,602	Breitung ...	
St. Paul ...	24,230	Hematite ...	
Stevenson ...	1,014,500	No. 2....	38,671
Susquehanna ...	20,984	Cambria ...	40,628
Tener ...	174,309	Champion ...	115,007
Troy ...	146,849	Cleveland ...	
Union ...	20,691	Cliffs ...	
Utica ...	268,281	Group ...	1,330,944
Victoria ...	64,820	Hartford ...	364,801
Virginia ...	5,674	Imperial ...	5,076
Wacoutah ...	6,766	Jackson ...	5,066
Webb ...	165,604	Lake An-	
Williams ...	17,685	geline ...	269,116
Winifred ...	3,415	Lake Su-	
Yates ...	265,289	perior ...	635,671
Total	23,792,782	Lillie ...	32,781
VERMILLION RANGE.		Lucy ...	85
Mine.	Gross tons.	Magnetic ...	292
1906.		Mary ...	
Chandler ...	318,990	Charlotte ...	257,088
Pioneer ...	766,853	Negaunee ...	253,448
Savoy ...	106,933	Palmer ...	13,131
Sibley ...	271,496	Princeton ...	166,894
Soudan ...	146,503	Queen ...	221,096
Zenith ...	181,580	Republic ...	177,220
Total	1,792,355	Richmond ...	89,563
GOGEBIC RANGE.		Volunteer ...	38,544
Mine.	Gross tons.	Total	4,057,187
1906.		MISCELLANEOUS.	
Anvil ...	79,493	(In Wisconsin)	
Ashland ...	341,841	Mine.	Gross tons.
Atlantic ...	97,689	1906.	
Brotherton ...	147,281	Iron Ridge ...	61,624
Cary ...	216,992	Illinois ...	67,118
Castile ...	2,108	Total	128,742
Colby ...	113,001	Grand Total	38,522,139

SHIPMENTS BY RANGES, GROSS TONS.						
	1906	1905	1904	1903	1902	1901
Marquette Range	4,057,187	4,210,522	2,843,703	3,040,245	3,868,025	3,245,346
Menominee Range	5,109,088	4,495,451	3,074,848	3,749,567	4,612,509	3,619,083
Gogebic Range	3,641,985	3,705,207	2,398,287	2,912,912	3,663,484	2,938,155
Vermillion Range	1,792,355	1,677,186	1,282,513	1,676,699	2,084,263	1,786,063
Mesabi Range	23,792,782	20,153,699	12,156,008	12,892,542	12,342,840	9,004,890
Miscellaneous	128,742	111,391	67,480	17,913		
Total	38,522,139	34,353,456	21,822,839	24,289,878	27,571,121	20,593,537
SHIPMENTS BY PORTS AND ALL-RAIL, GROSS TONS.						
	1906	1905	1904	1903	1902	1901
Escanaba	5,851,050	5,307,938	3,644,267	4,277,561	5,413,704	4,022,668
Marquette	2,791,033	2,977,828	1,907,301	2,007,346	2,595,010	2,354,284
Ashland	3,388,106	3,485,344	2,288,400	2,823,119	3,553,919	2,886,252
Ashland	3,388,106	3,485,344	2,288,400	2,823,119	3,553,919	2,886,252
Two Harbors	8,180,125	7,779,850	4,566,542	5,120,656	5,605,185	5,018,197
Gladstone		5,118,385	4,169,990	3,978,579	4,180,568	2,321,077
Superior	6,084,057		553	35,816	92,375	117,089
Duluth	11,220,218	8,807,559	4,649,611	5,356,473	5,598,408	3,437,955
Total by lake	37,513,595	33,476,904	21,226,664	23,649,550	27,039,169	20,157,522
Total by rail	1,008,544	876,552	596,175	640,328	531,952	436,015
Total shipments	38,522,139	34,353,456	21,822,839	24,289,878	27,571,121	20,593,537

bic range that next year's shipment will be in excess of the 3,641,985 tons produced this year, though, in all probability the percentage of the entire shipment which the Gogebic ore constitutes in 1906, 8.9 per cent, as compared with 10.85 per cent of 1905, will not be larger.

The Menominee range increased its output, approximately, one-half million tons in the past year over 1905, and saw the return to the ranks of producing mines, the old Perkins property now known as the Saginaw, which had not been operated since 1895. The only notations necessary are in connection with the Antoine mine, equally well known as the Clifford or Traders, the old Appleton, recently acquired by the Loretto Iron Co., now known as the Eleanor, and the Paint River mine, from which some shipments are designated Fairbanks.

On the Marquette range the past year witnessed a slight falling off in the amount of ore shipped, due in part to labor difficulties and also to a large amount of effort spent in development work. The old American mine, belonging to M. A. Hanna & Co., which has not shipped any ore for 12 years, was operated in 1906, though it produced only 419 tons, all of which was shipped all rail. In explanation of the list as it will appear in our chart, it may be said that the Blue mine now ships as the Queen and the old Rolling Mill property is known as the Chester. As usual, the Morrow, Cliffs Shaft, Lake, Salisbury, Ogden and Austin mines are reported as the Cleveland Cliffs group. The Marquette range produced of the total shipments 10.5 per cent, as compared with 12.38 per cent in 1905.

The largest single producer, as in 1905, was the Mountain Iron on the Mesabi range, which produced 2,536,249 tons, instead of the 3,000,000-ton output which was variously estimated early in the season. The significant feature about this year's shipments is undoubtedly the large amount shipped all rail. There seems to be no other reason for this where ore is brought to other points than Duluth or Milwaukee by this method than that the unloading facilities at receiving ports have been insufficient to care for the lake shipments. The new facilities now being erected will tend to decrease the all rail shipments in 1907.

INTERESTING TO SHIP BUILDERS.

Certain calculations made in a recent interview by Eugene Tyler Chamberlain, commissioner of navigation, will be examined with great interest by all steel makers and ship builders. The subtraction of the cargo feature from the shipping bill seems to have given rise to the impression that the measure as now drawn is of slight interest to shipbuild-

ing and its allied industries, on the assumption that the lines provided for in the bill may be maintained by vessels already in existence. Commissioner Chamberlain proves that this impression is wholly erroneous. Mr. Chamberlain has figured that the full equipment of the mail steamship lines, provided by the bill, would involve the expenditure of more than \$32,000,000 in the construction of approximately 26 vessels, ranging from 6,000 to 12,000 gross tons each. These 26 vessels would give a fortnightly service. They would aggregate 216,000 tons, which at an average cost of \$150 per ton means \$32,400,000. Even should it be decided to execute the service on a monthly basis, approximately one-half of this expenditure would be required.

The proposed line from ports on the Atlantic coast to Brazil of 16-knot vessels, receiving a subvention of \$600,000 per annum, according to Mr. Chamberlain would require five ships of 8,000 tons each, or an aggregate of 40,000 tons.

The line from Atlantic coast ports to the Argentine, employing 16-knot vessels and receiving a subvention of \$800,000 per annum, would require six vessels of 8,000 tons each, or an aggregate of 48,000 tons.

The line from ports on the Pacific coast to Peru, Chili, by 16-knot vessels at a compensation of \$600,000 per annum would require six new vessels of 6,000 tons each, or 36,000 tons. The line from Pacific coast ports to the Orient, touching at Hawaii, Japan, China and the Philippines and employing 16-knot vessels, receiving an annual compensation of \$700,000, would require not less than six 10,000-ton ships, or an aggregate of 60,000 tons. Contrary to general belief, there are no vessels on the Pacific coast available for this service. It is doubtful if any of the present vessels come within the requirement of a sustained sea speed of 16 knots.

Commissioner Chamberlain estimates that the construction of a vessel of 8,000 tons would be needed to complete a service once in three weeks to the Samoan Islands.

Mr. Chamberlain's conclusions are therefore summarized as follows:

Ser-vice.	Ves-sels.	Indi-vid-ual Ton-nage.	Aggre-gate Ton-nage.
Brazil	5	8,000	40,000
Argentina	6	8,000	48,000
Panama	6	6,000	36,000
Peru and Chili	6	6,000	36,000
Orient via Hawaii	2	12,000	24,000
Orient direct	6	10,000	60,000
Australasia	1	8,000	8,000
Totals	26		216,000

No man in the country is more competent to estimate available supply and the steamship requirements of the bill than Mr. Chamberlain. He has made a careful investigation into the present employment of all vessels that might be

available for the projected lines and has reached the conclusion that there are no ships in existence that meet the requirements that are really available. Even should a vessel here and there be withdrawn from the coastwise trade, other vessels would be immediately required to replace the depletion, as the coastwise trade is in a flourishing condition. He states with emphasis that the pending bill would greatly stimulate the shipbuilding industry and in his opinion the facilities of existing shipyards would be taxed for several years to meet all the new contract requirements, in addition to the natural growth of the coastwise trade and the reasonable growth of trade along the projected mail lines.

THE MAN AT THE WHEEL.

Editor MARINE REVIEW:—In a recent issue of the MARINE REVIEW there is apparently an error by the author of the story "The Man at the Wheel." The mate here states of coming on deck and on seeing a red light ahead gives the order "Hard a starboard." It seems to me that he should have done just the opposite, in other words said, "Hard a port." At any rate I would like to see this question discussed along with your other articles on scientific navigation.

ONCE A WHEELSMAN.

EDWIN S. CRAMP RESIGNS.

Edwin S. Cramp has resigned from the vice presidency of Cramps, Philadelphia. Mr. Cramp was the last one of his name to be connected with the famous firm, which has built battle-ships and cruisers for nearly every nation, besides some of the finest merchant vessels afloat.

GREAT LAKES TOWING CO.

The directors of the Great Lakes Towing Co., held their annual meeting Wednesday and re-elected the old officers as follows: Chairman of the board Gen. G. A. Garretson, vice chairman of the board, H. G. Dalton, president and treasurer, Edward Smith, of Buffalo; first vice president, Capt. James Davidson, of Bay City; second vice-president, A. B. Wolvin, of Duluth; third vice president, T. E. Newman; secretary and assistant treasurer, M. H. Wardwell; general counsel, James H. Hoyt and Harvey D. Goulder.

The members of the executive committee are Gen. G. A. Garretson, Edward Smith, C. E. Grover, H. G. Dalton, D. Sullivan, James Davidson, A. B. Wolvin, L. M. Bowers and Robert R. Rhodes.

SUMMARY OF NAVAL CONSTRUCTION.

The Connecticut and Louisiana have now disappeared from the construction list of the navy and the story of the race is a closed incident as far as the ship yards are concerned. Following is the program showing present stage of progress on all naval vessels:

Name of Vessel.	Building at	Per cent of Completion.	
		Jan. 1, 1907.	Feb. 1, 1907.
BATTLESHIPS.			
Nebraska	Moran Bros. Co.....	98.10	98.78
Vermont	Fore River S. B. Co.....	97.5	99.0
Kansas	New York S. B. Co.....	96.9	97.4
Minnesota	Newport News S. B. Co.....	98.5	99.
Mississippi	Wm. Cramp & Sons.....	70.68	71.72
Idaho	Wm. Cramp & Sons.....	66.78	67.87
New Hampshire	New York S. B. Co.....	60.8	61.8
South Carolina	Wm. Cramp & Sons.....	5.08	6.32
Michigan	New York S. B. Co.....	3.01	5.9
ARMORED CRUISERS.			
California	Union Iron Works	97.4	97.8
South Dakota	Union Iron Works	94.8	95.2
North Carolina	Newport News S. B. Co.....	69.16	71.56
Montana	Newport News S. B. Co.....	63.59	66.05
PROTECTED CRUISERS.			
Milwaukee	Union Iron Works	99.06	99.96
TRAINING SHIPS.			
Cumberland	Navy Yard, Boston	99.9	99.9
Intrepid	Navy Yard, Mare Island	100.	
SCOUT CRUISERS.			
Chester	Bath Iron Works	59.42	64.18
Birmingham	Fore River S. B. Co.....	56.6	59.
Salem	Fore River S. B. Co.....	56.5	59.2
SUBMARINE TORPEDO BOATS.			
Submarine T. B. No. 9.....	Fore River S. B. Co.....	90.0	91.0
Submarine T. B. No. 10.....	Fore River S. B. Co.....	82.7	89.1
Submarine T. B. No. 11.....	Fore River S. B. Co.....	92.0	92.5
Submarine T. B. No. 12.....	Fore River S. B. Co.....	81.1	88.5

CARLEY LIFE FLOAT.

Francis T. Parks, of the Carley Life Float Co., Produce Exchange Bldg., New York, was in the great lakes district last week in behalf of the Carley life float. This float has been approved by the Supervising Board of Steamboat Inspectors, by the Board of Trade of Great Britain, and by the Department of Marine and Fisheries of Canada. It has been adopted by the United States navy. This float has been frequently described. It consists of a copper tube in the shape of an ellipse divided into water-tight compartments and protected from the elements by a covering of cork, heavy duck and paint. Suspended from the tube by a rope net is a slatted oak floor upon which persons on the raft stand partly submerged. The practicality of this raft lies in the fact that it is always right side up. All that it is necessary to do is to throw it overboard.

The steamboat inspection service has given it a rating allowing the number of persons which can actually be carried. Under this rule the Carley float has a greater carrying capacity for its size and weight than any life raft now in use.

PRESIDENT ROOSEVELT AND THE COAL LANDS.

Close on the heels of Rear Admiral Robley D. Evans' proposal that the government conserve all anthracite for future naval uses comes the message of President Roosevelt to congress of Feb. 13, in which he advocates the conservation of coal and other fuel

pounder saluting guns, four one-pounder semi-automatic, two 3-in. field pieces, and two machine guns of 0.30 caliber. The battery of 14 5-in. guns will be on the gun deck, forming two broadside batteries of seven guns each; the corner guns will be equipped for head and stern firing respectively. Smaller guns will be placed in commanding positions so as to give a large unobstructed range of fire.

MORSE FAILS TO GET SOUND LINES.

After having all but completed a deal whereby would be added to their present holdings the sound lines controlled by the New York, New Haven & Hartford railway, the Charles W. Morse interests failed at last to consummate the deal owing to the refusal of the directors to ratify the agreement between Mr. Morse and J. Pierpont Morgan, representing the railway. It is known that the offer amounted in round numbers to about \$20,000,000, which was regarded by the directors as a very attractive price, but as a matter of policy it was decided best to retain the steamship lines. It is understood that after the discussion of the matter by the board, all the New Haven directors were of the opinion that the sale to Mr. Morse should not be made.

Opposition to the acceptance of the offer made by Mr. Morse, who planned to merge these lines with his other coastwise lines, was expressed not only by the New Haven & Hartford, but by the Pennsylvania railroad interests, represented on the New Haven board by President McCrea. The latter has large interests in the traffic handled by the Sound steamers and did not care to see its profits from this source jeopardized in any way.

PLAN TO RECOVER SUNKEN GOLD.

An agreement was concluded recently between the Lutine Co., representing the insurers, and Fred B. Whitney, of Washington, D. C., whereby further attempts will be made to salve the bullion which formed part of the cargo of the British warship Lutine, which foundered off the coast of Holland in 1799. The British parliament granted the insurers, Lloyds, the right to \$1,680,000 of the sunken gold, half of which, under the present agreement, will, if recovered, go to the salvors. Simon Lake, the American submarine boat builder of Bridgeport, Conn., will be consulting engineer for the Lutine Co.

resources in lands still belonging to the government, saying that henceforth the nation should retain its title to its fuel resources, and urges government control of the western public land pastures, with a system of small grazing fees, etc. He contends for a system of government leasing of its mineral lands and for treating these fuel lands as public utilities.

PLANS FOR NEW BATTLESHIP.

Senator Hale recently presented to the senate the detailed plans for the big battleship which it is proposed shall be built as the equal of any fighting vessel now afloat or planned.

The plans call for a battleship 518¾ ft. long, with a beam of 85 ft. 2½ in. and a draught of 29 ft. 5 in., with everything on board. The armament will consist of a main battery of 10 12-in. rifles, mounted on five electrically controlled turrets on the center line; two forward above the forecastle deck, the second firing over the first; two aft on the main deck on the same level, and one amidships, firing over the two after turrets. There are to be two submerged torpedo tubes.

The second battery will consist of 14 5-in. rapid-firing guns, four three-